ADOBE CREEK UPPER REACH 5
EROSION CONTROL PROJECT

2014
ANNUAL MONITORING REPORT

US Army Corps of Engineer File Number 2007-00793S

Prepared By:

Ryan Heacock
Environmental Planner

December 29, 2014

PURPOSE AND PROJECT LOCATION

Purpose of Report

This Annual Monitoring Report is the Corps of Engineers' permit condition for Adobe Creek Erosion and Flood Control Project, Permit Number 2007-00793S.

The goal of the report is to provide an annual performance update of the project site along Adobe Creek, downstream of West Edith Avenue, for five (5) years after the project is completed. Six cross sections and one longitudinal channel along the project area profile shall be surveyed annually with results and variances presented within this report.

Construction was completed in 2008. This report serves as the fifth, and final, annual post-construction report. Due to some errors in the survey data collected immediately post-construction, the first year monitoring report used the cross section at station 1+120 rather than the cross section at 1+112 as shown in Figure 2. The cross section at station 1+20 was used again in this year's report for consistency, and will continue to be used for the duration of the monitoring period.

Project Location

Adobe Creek lies within the Lower Peninsula Watershed. The watershed is located in the northwestern portion of Santa Clara County. Adobe Creek drains an area of approximately 10 square miles of which roughly 7.5 square miles are mountainous and 2.5 square miles are valley floor. The creek ultimately flows into the Palo Alto Flood Basin immediately northeast of the Bayshore Freeway (Highway 101).

At this location, Adobe Creek forms the boundary between the City of Los Altos (east bank) and the Town of Los Altos Hills (west bank). Adobe Creek Upper Reach 5 is located downstream of West Edith Avenue, as shown on the site map below. The extent of the project work began at West Edith Avenue and continued downstream for approximately 1,100 linear feet.

Figure 1. Site Map

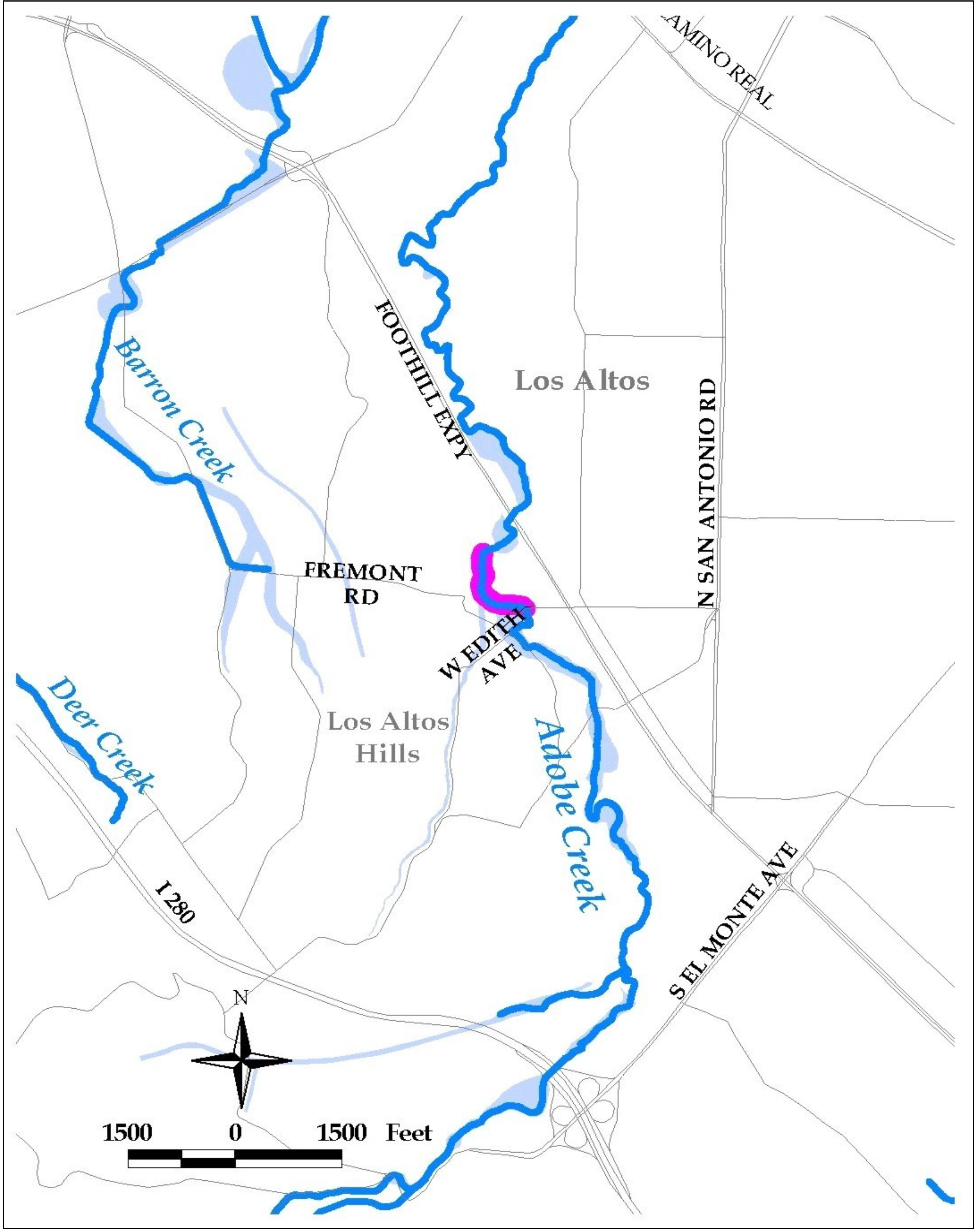
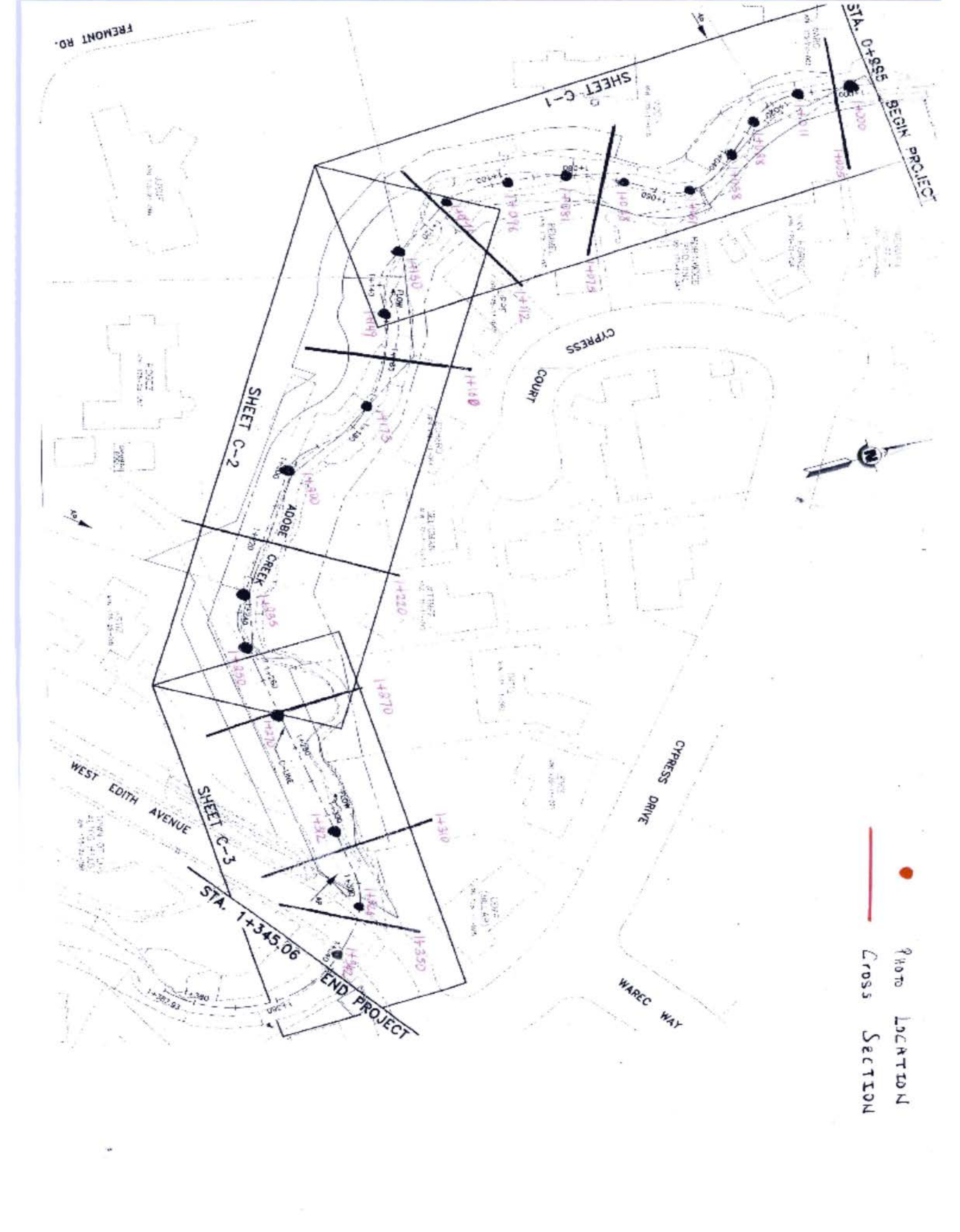


Figure 2. Map of cross sections and photo locations



PROJECT DESCRIPTION

The Adobe Creek Upper Reach 5 Channel improvements consisted of a modified natural geomorphic channel with a limited channel top width for 500 feet downstream of West Edith Avenue and a geomorphic channel with “fish passable” step pools for the following 200 feet, ending at the Robleda storm drain outlet. 400 feet downstream of the Robleda storm drain outlet, the repair consisted of: 1) stabilizing the channel invert with “fish passable” step pools along the invert; 2) placing rock from the channel toe to three feet up the bank; 3) placing rock rip-rap slope protection at eroded channel banks up to the ten-percent water surface elevation; and 4) reinforcing the existing cutoff walls at the toe of existing sacked concrete slope protection.

MONITORING EVALUATION

Longitudinal Profile

There has been little to no change in channel slope within the project reach over the past two years of monitoring. Some very localized changes have occurred as sediment has deposited upstream of the rock weir structures and scour pools have formed downstream, as expected. The average overall elevation of the channel at each cross section has remained relatively unchanged.

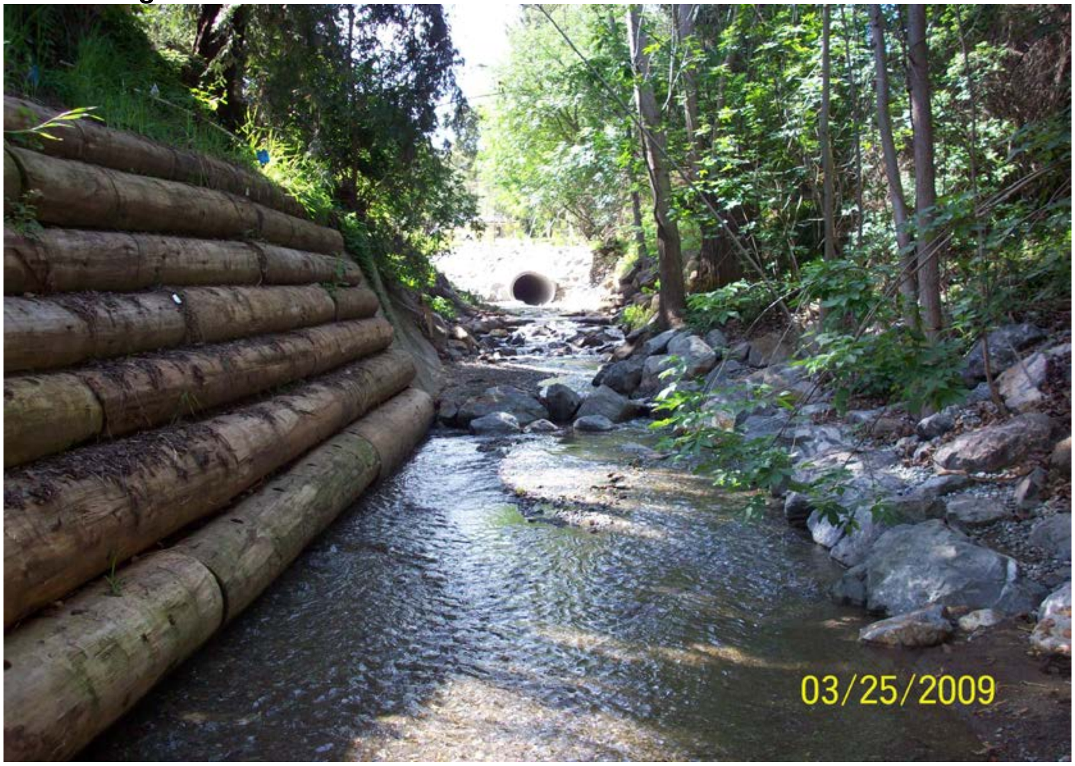
Site Evaluation – Station 1+073

This site consisted of constructing a log wall downstream of an existing shotcrete bank, placing a rock cross vane at the upstream end of the log structure to control the invert grade, and adding a rock toe bank protection measure on the opposite bank of the log wall. The area above the log wall was vegetated with native plants.

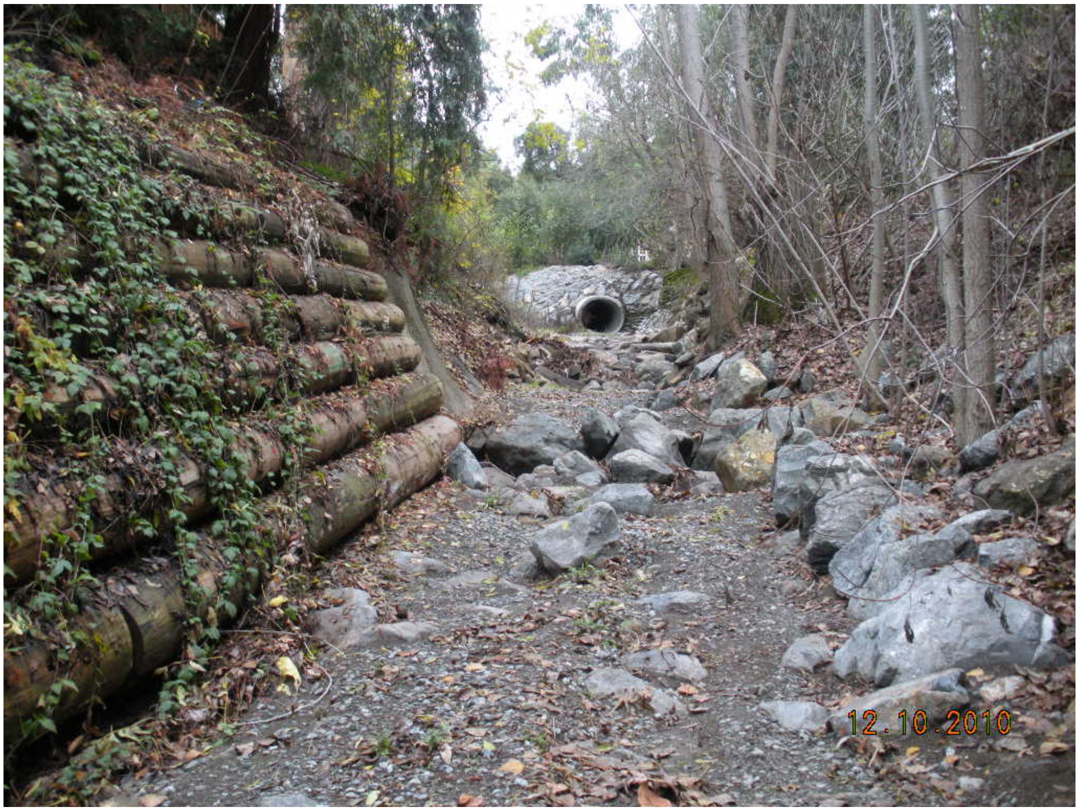
According to the cross section survey data, there has been very little change in profile at this location. The log wall and rock toe are stable.

Field observations show one or two rocks that have moved from the rock cross vane structure during the first post-construction year have remained in place and do not pose a threat to the site. Vegetation above the log wall has established itself and is growing over the structure. Stream bed material has built up behind the rock cross vane and has stabilized the invert elevation.

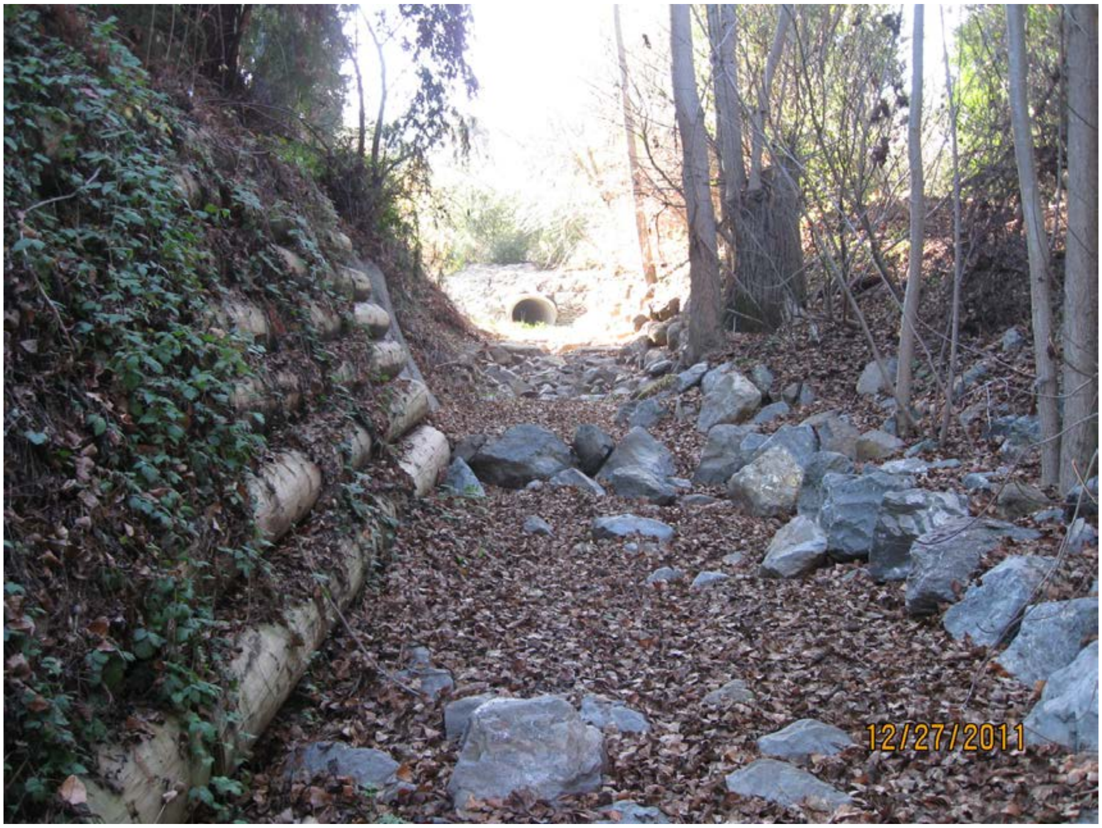
Monitoring Photos:



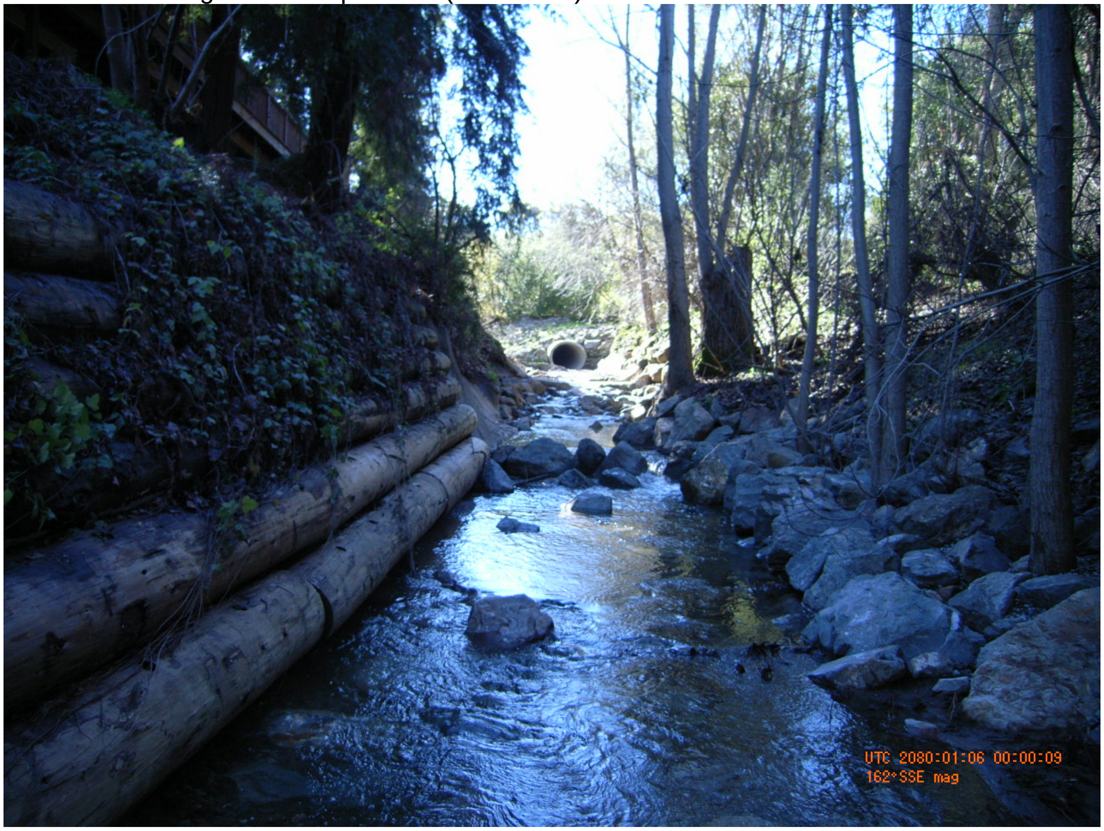
Post-Construction – Upstream View (March 2009)



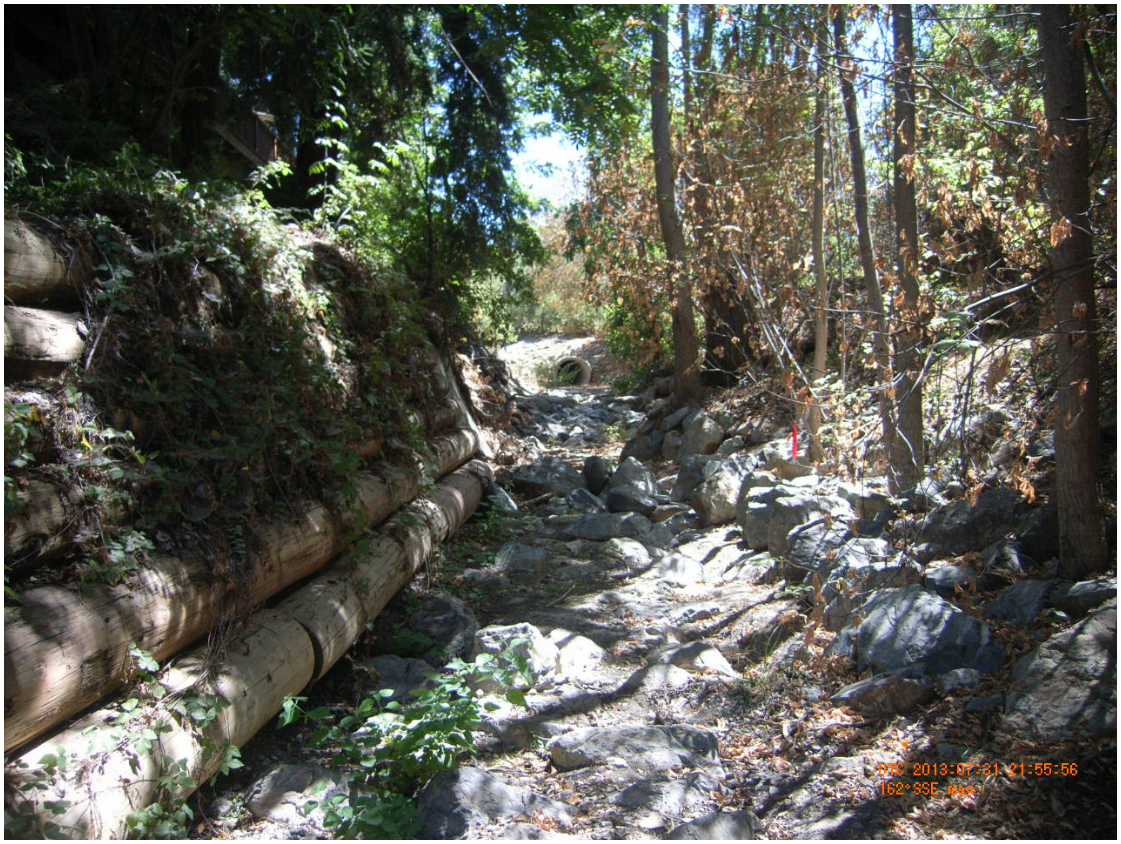
Year 1 Monitoring Photo – Upstream View (Dec. 2010)



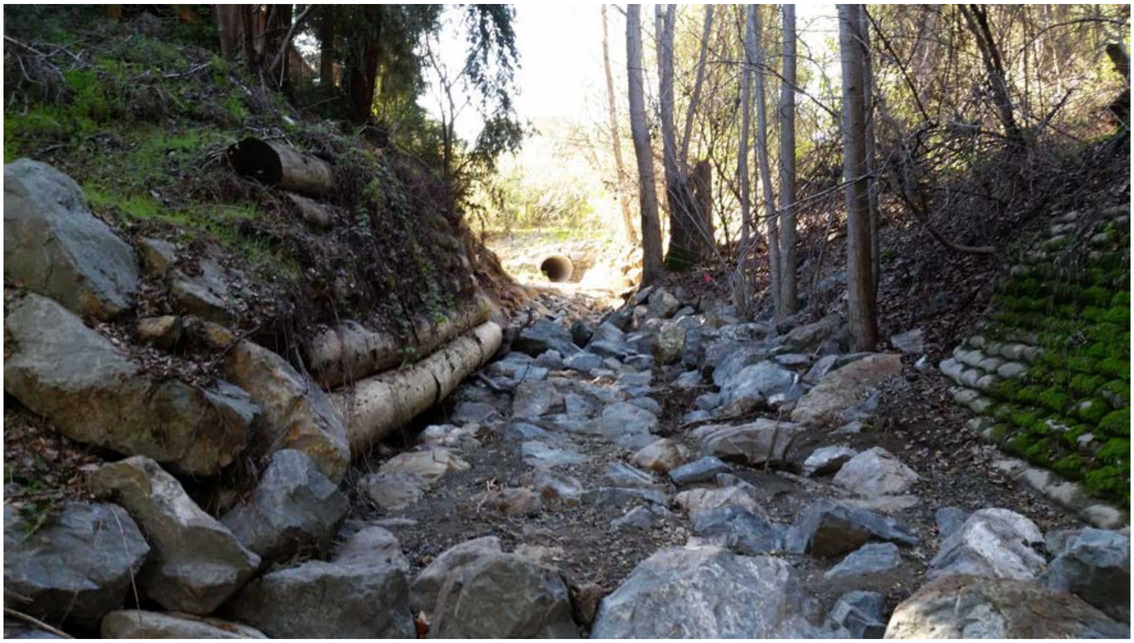
Year 2 Monitoring Photo – Upstream (Dec. 2011)



Year 3 Monitoring Photo – Upstream (Dec. 2012)



Year 4 Monitoring Photo – Upstream (July 2013)



Year 5 Monitoring Photo – Upstream (December 2014)

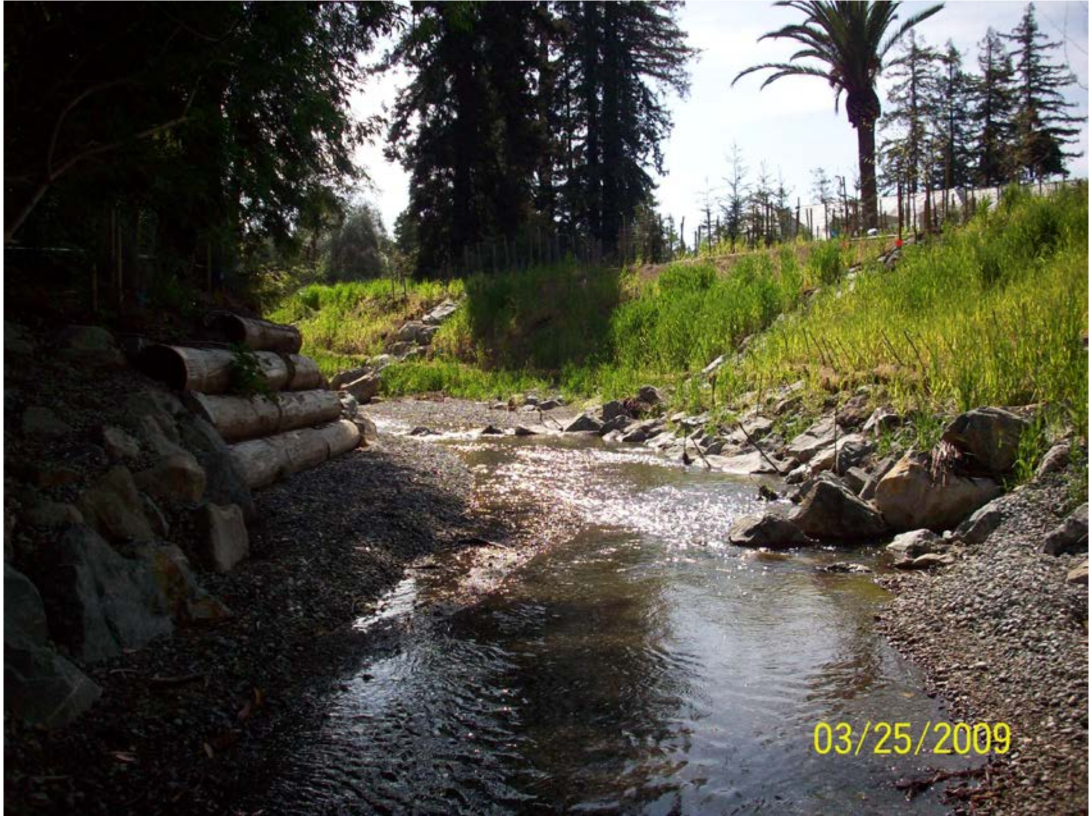
Site Evaluation – Station 1+120

This site repair consisted of constructing a low log bank stabilizing structure and a rock toe bank protection measure. Improvements along the opposite bank included a rock toe, and rock spurs to redirect flows to the center of the channel, protecting the bank from erosion. A rock cross vane at the upstream side of the log wall was constructed as a grade control measure. Existing sacked concrete along the invert was removed and replaced with a thick layer of gravel. Willow stakes were planted along the toe of the west bank and the bank was hydroseeded.

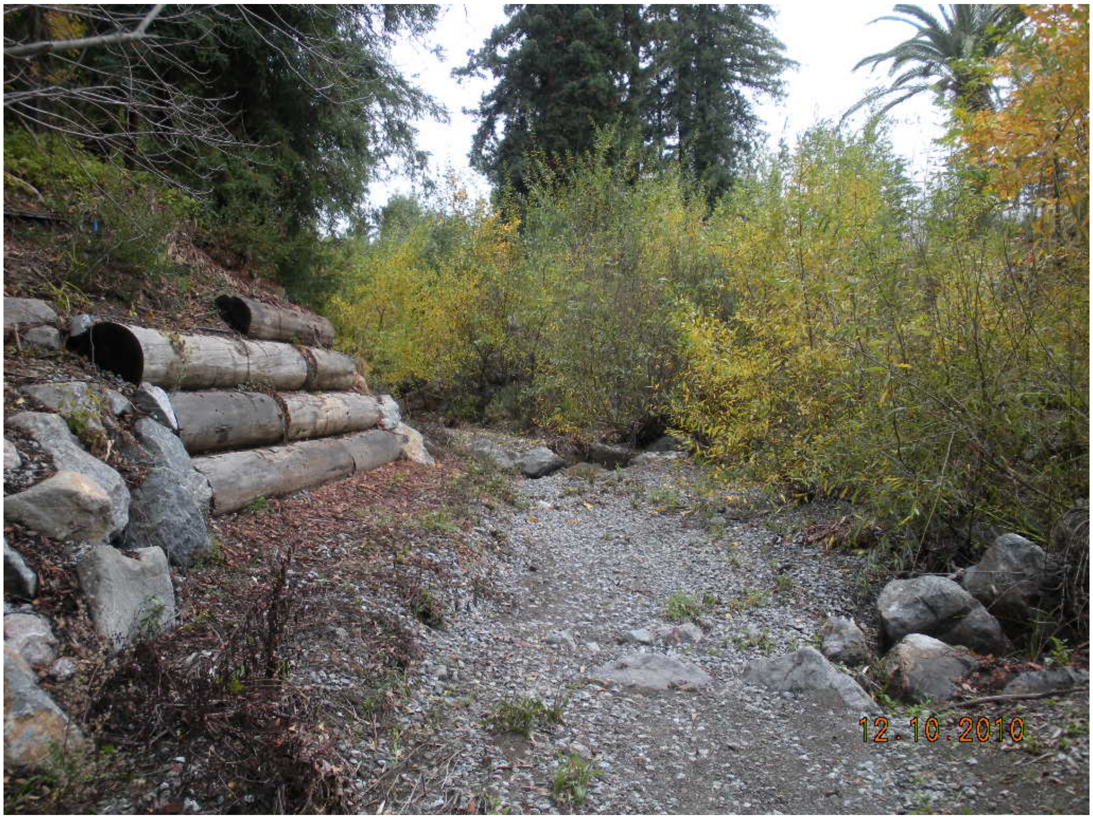
According to the survey data, the profile of the channel at this location has not changed significantly. The site is stable and holding the designed channel profile very well.

Field observations show the willow stakes continue to perform well and are currently over 10 feet high. The west bank is barely visible through the willows. Both the log wall and the rock toes are stable. The scour pool formed in year one on the downstream side of the upstream rock cross vane, remains stable, and has stabilized the invert elevation.

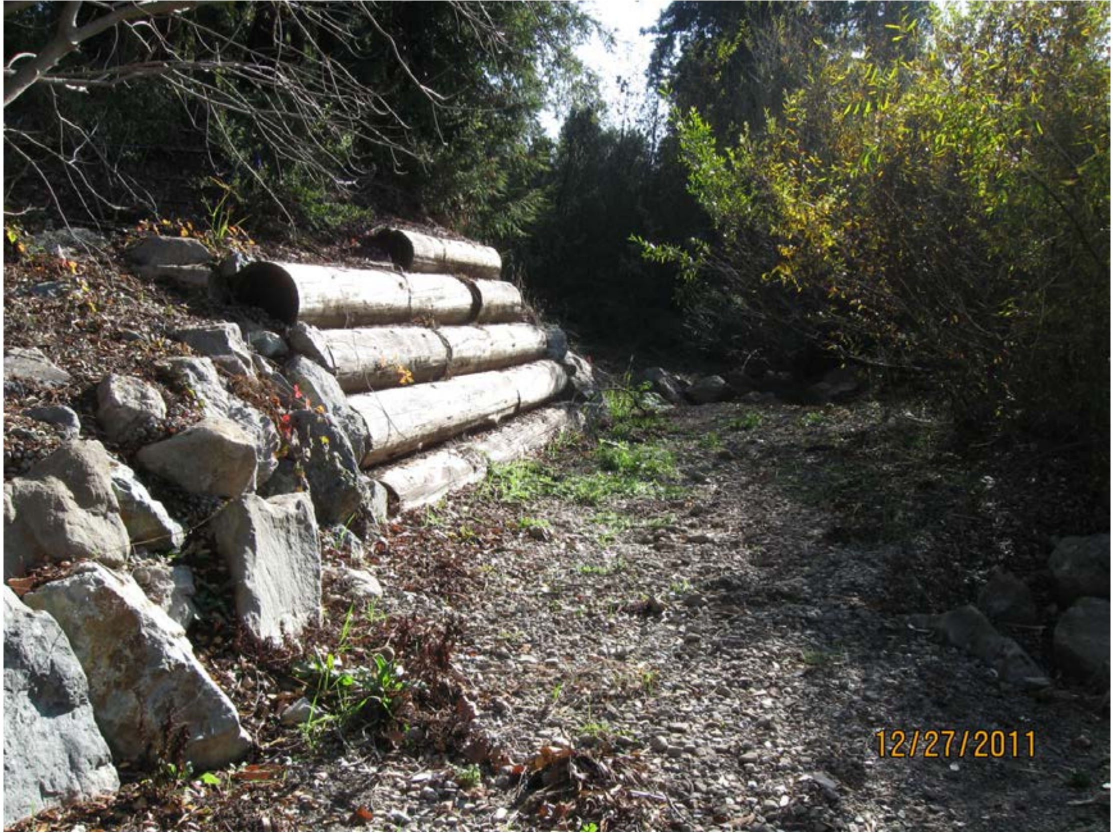
Monitoring Photos:



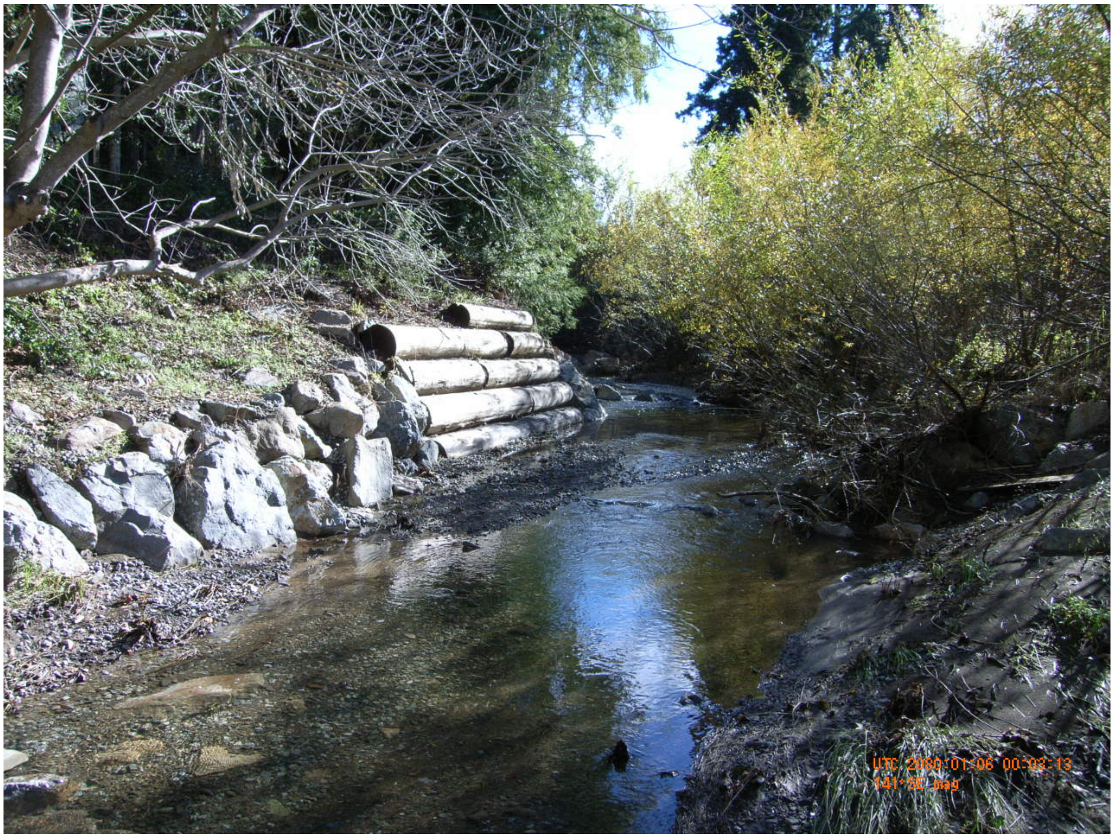
Post Construction – Upstream View (March 2009)



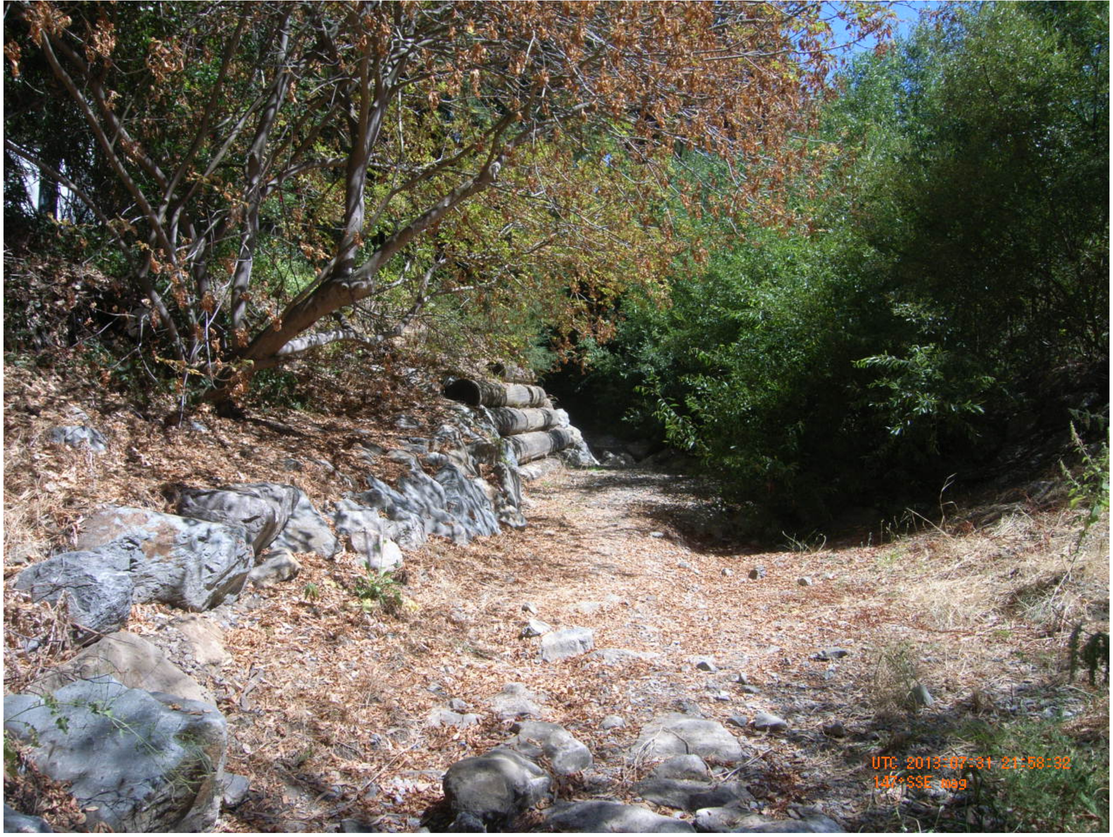
Year 1 Monitoring Photo – Upstream View (Dec. 2010)



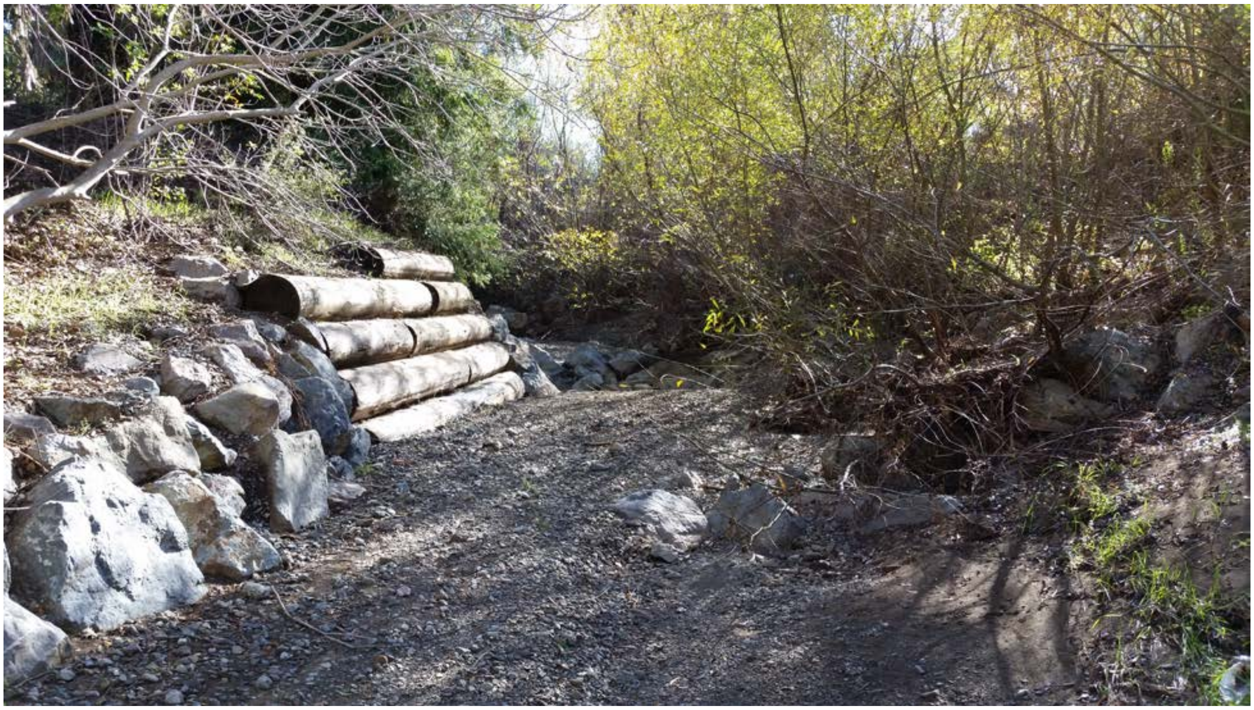
Year 2 Monitoring Photo – Upstream View (Dec. 2011)



Year 3 Monitoring Photo – Upstream (Dec. 2012)



Year 4 Monitoring Photo – Upstream (July 2013)



Year 5 Monitoring Photo – Upstream (December 2014)

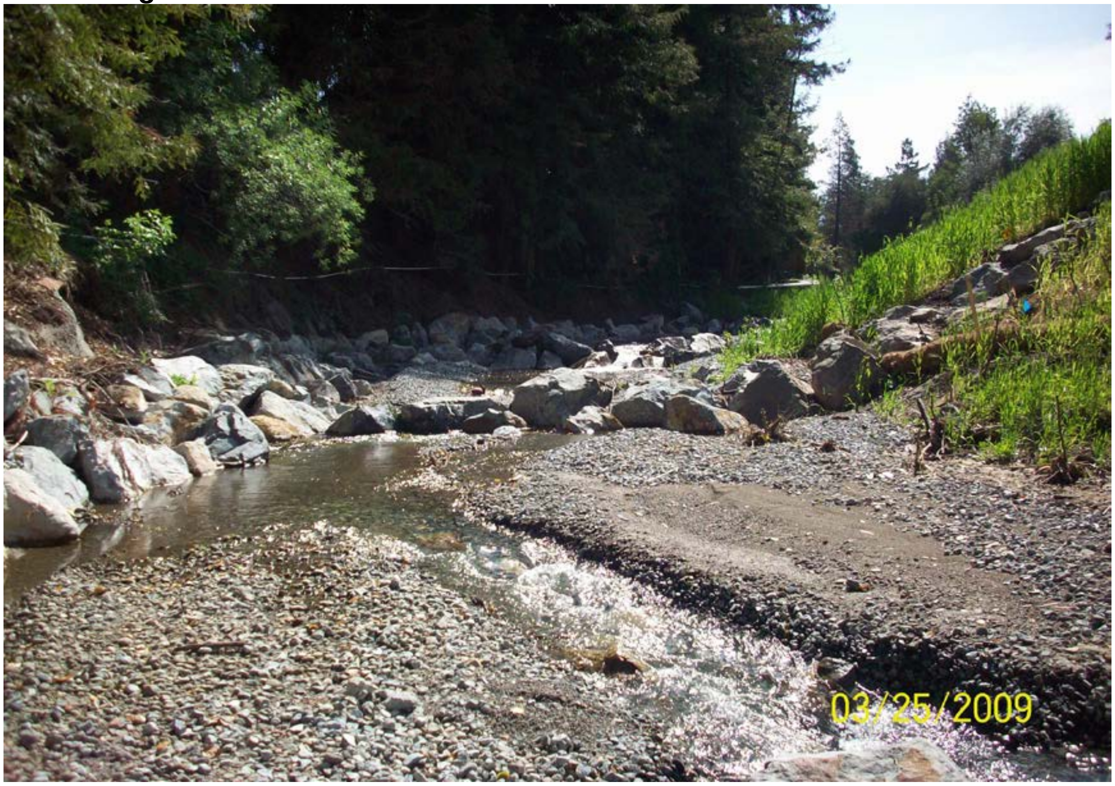
Site Evaluation – Station 1+160

The repairs at this location consisted of leaving the existing shotcrete bank and placing rock along the toe, removing an existing concrete weir, and constructing a series of rock cross vanes to create a step pool system. Willow stakes were planted along the toe of the west bank and the slope was hydroseeded.

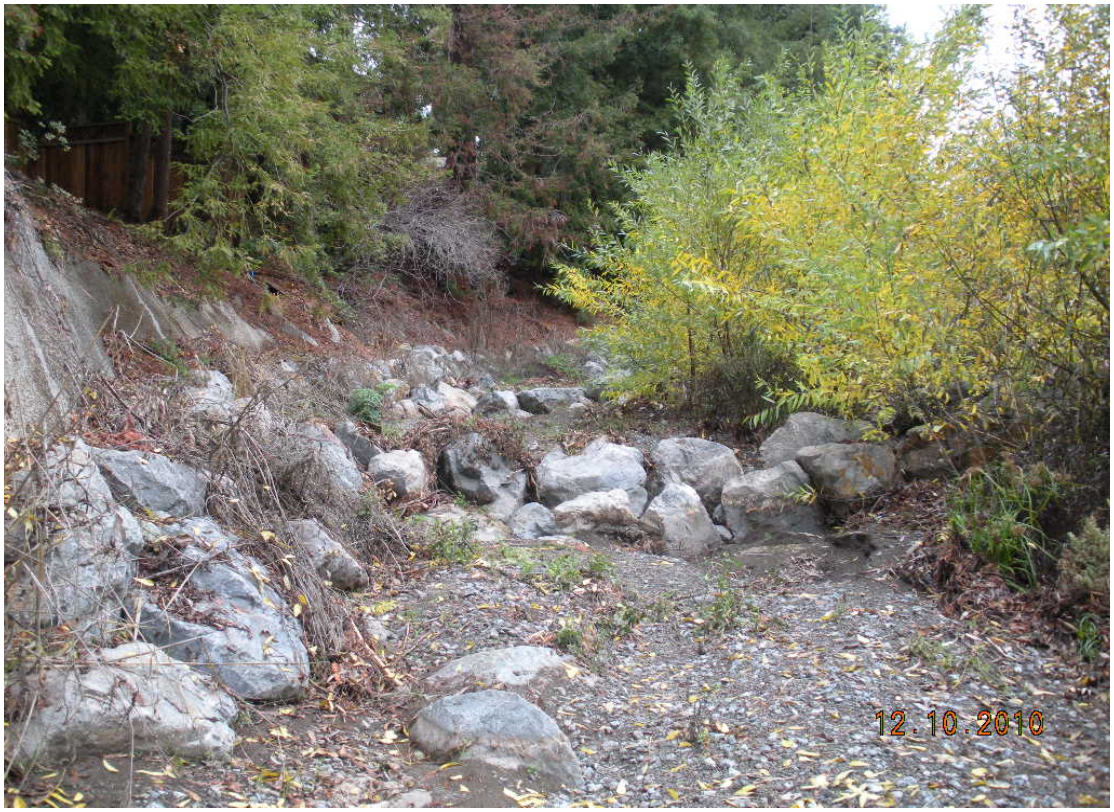
The survey data shows that the build-up of invert material at this location in year one is no longer there. The invert has returned to its approximate design elevation.

Field observations show the rock toe and rock cross vanes are stable and performing as designed. The willows and plantings have thrived and are slowing the water velocity, but still allowing for normal movement of sediment.

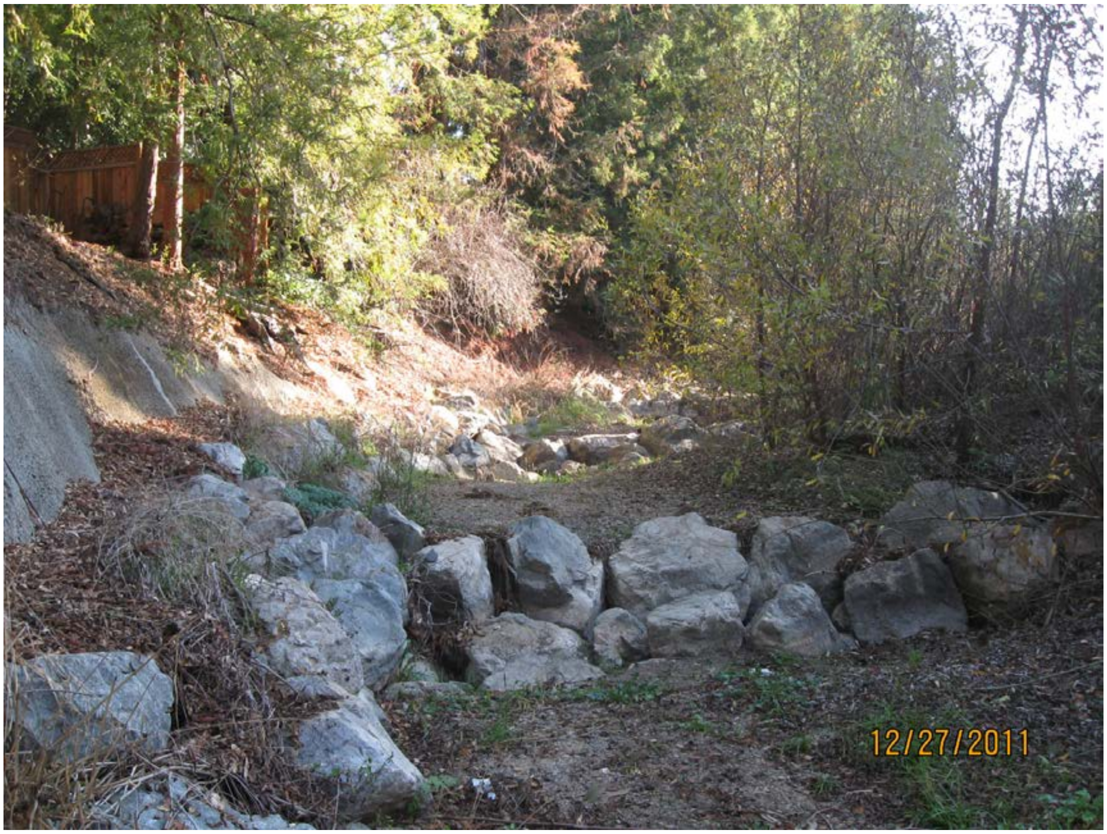
Monitoring Photos



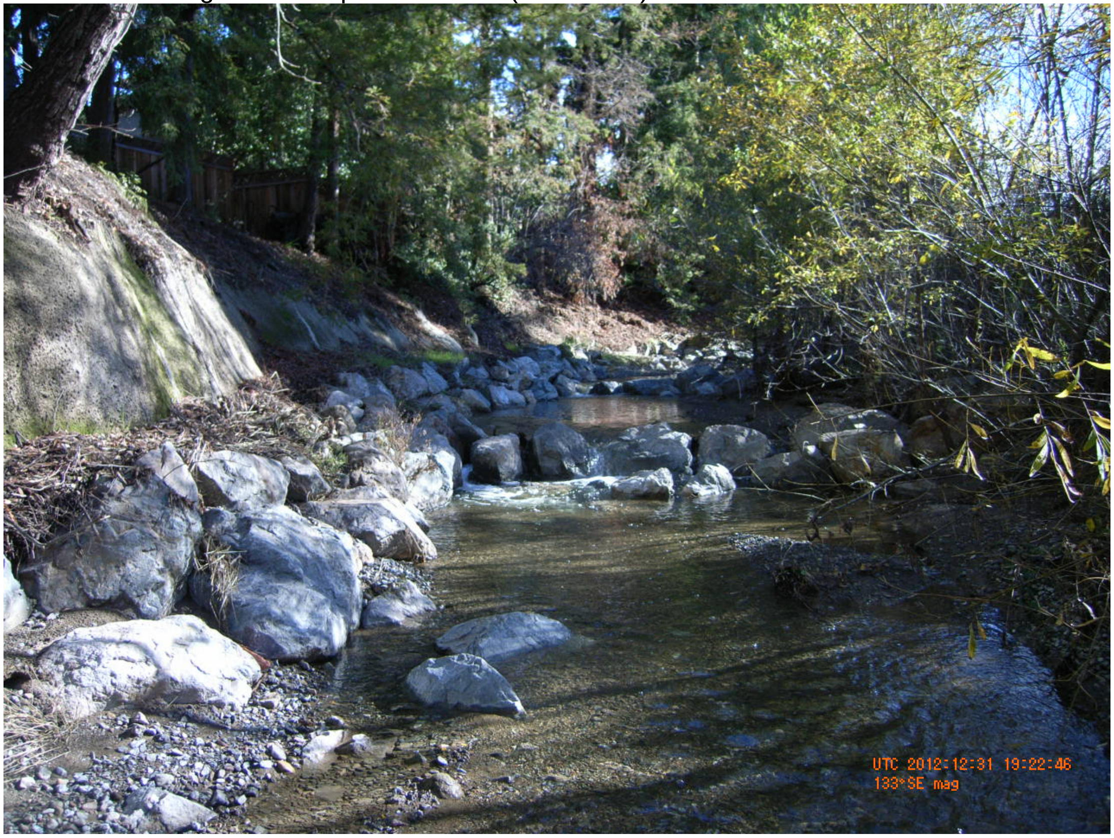
Post Construction – Upstream View (March 2009)



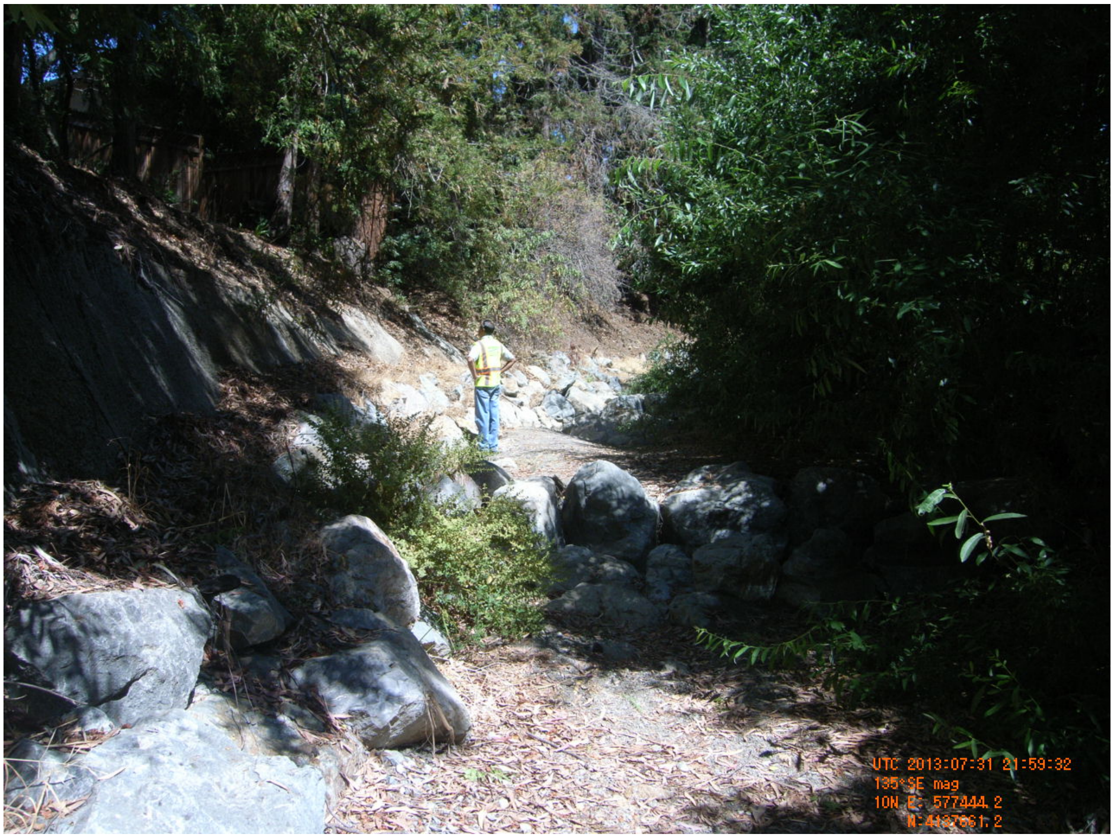
Year 1 Monitoring Photo – Upstream View (Dec. 2010)



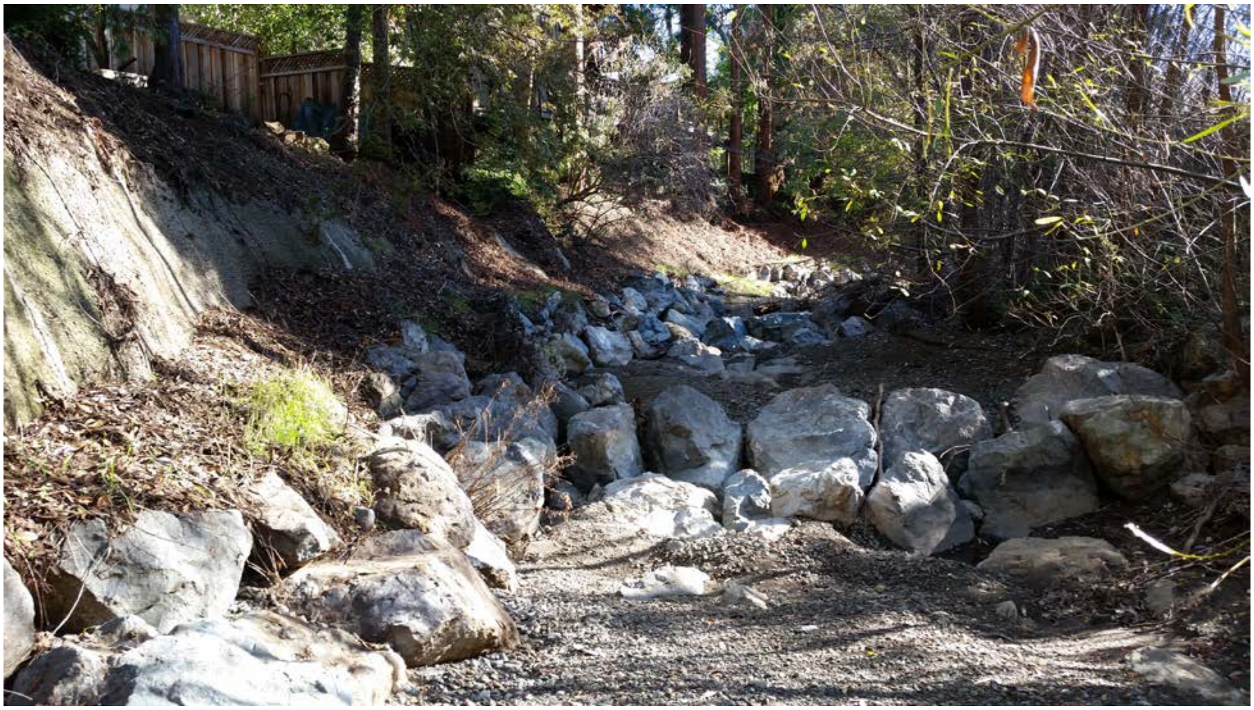
Year 2 Monitoring Photo – Upstream View (Dec. 2011)



Year 3 Monitoring Photo – Upstream (Dec. 2012)



Year 4 Monitoring Photo – Upstream (July 2013)



Year 5 Monitoring Photo – Upstream (December 2014)

Site Evaluation – Station 1+220

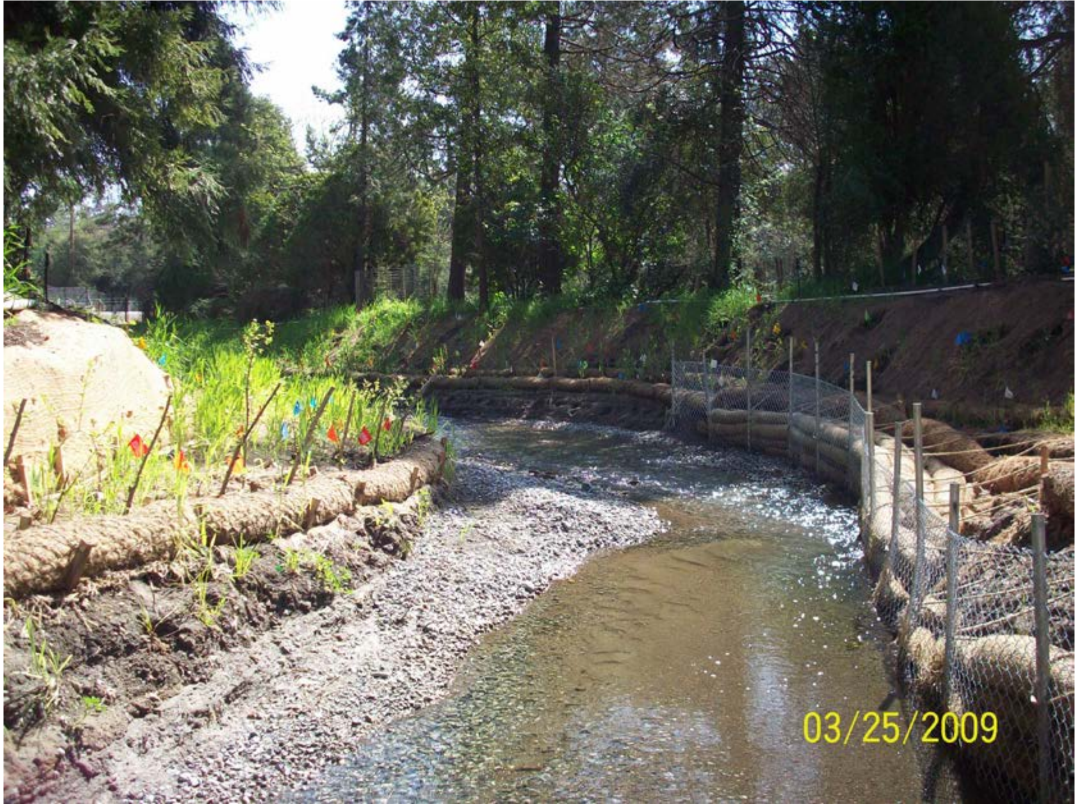
The repairs at this site consisted of removing and plugging an existing city storm drain outfall, removing an abandoned observation well, widening the channel invert (low flow channel) with 1:1 side slopes, and constructing a low flood plain (bench) on both sides of the channel.

There were errors in the post-construction (2008) survey data, so field observations will be the sole monitoring source for this site again this year. A cross section was acquired at this station during this year's survey work and will be used for comparison in next year's report.

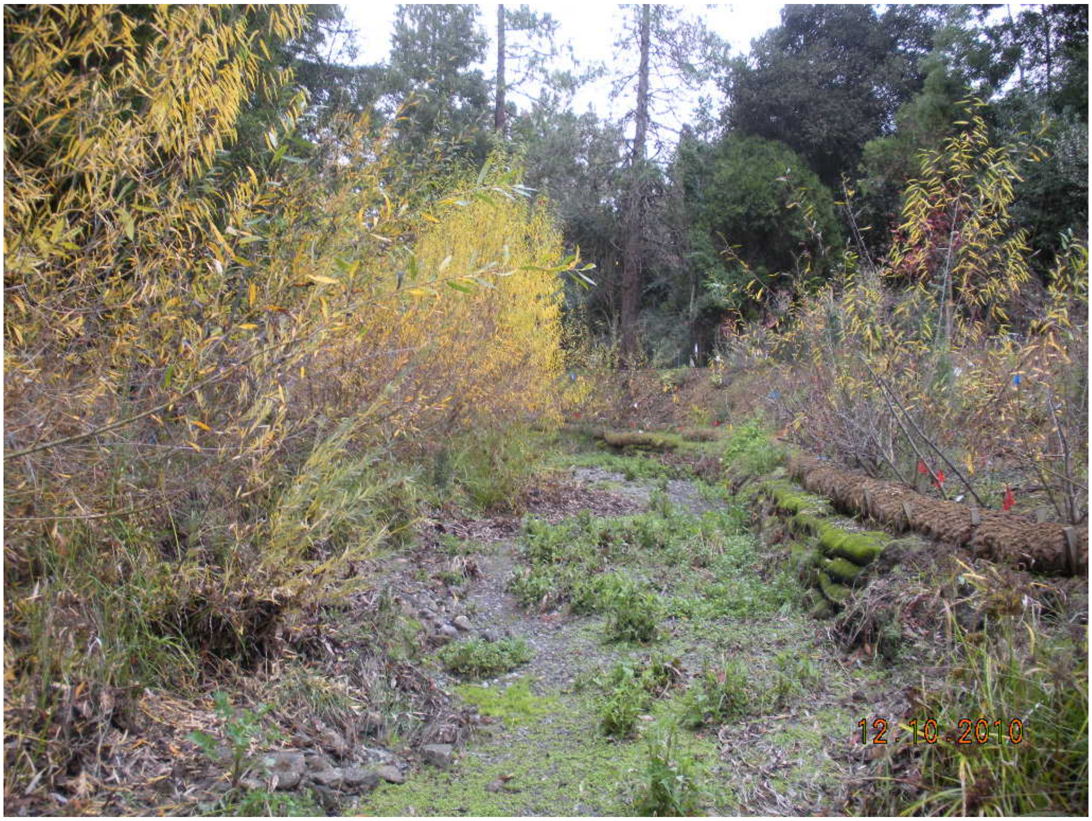
During the winter storms after construction in 2009, the west bank experienced severe erosion. As a temporary repair, large straw wattles and coir logs were placed behind a cyclone fence (as seen in post-construction photo below) to stabilize the bank until crews could access the area to construct a permanent repair. During the summer of 2009, District field crews placed black bags filled with sand along the toe to rebuild the eroding slope. The bags were secured to each other and to the existing ground with rebar. The area was replanted due to the loss of plants caused by the erosion.

Field observations show the sand bags continue to hold up well and a scour pool formed in year one along the toe continues to remain stable. Vegetation along the bank has become well established and no further erosion has been observed. The plantings are doing well and the willow stakes are thriving, growing over the channel.

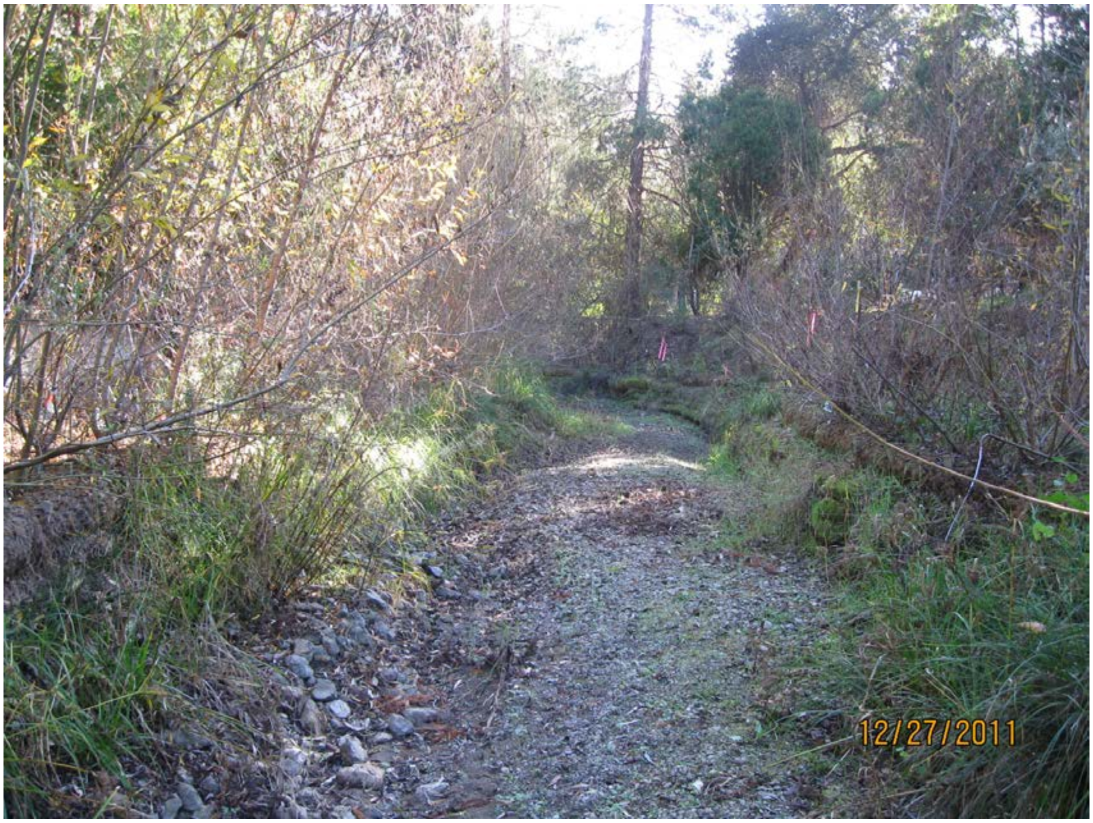
Monitoring Photos



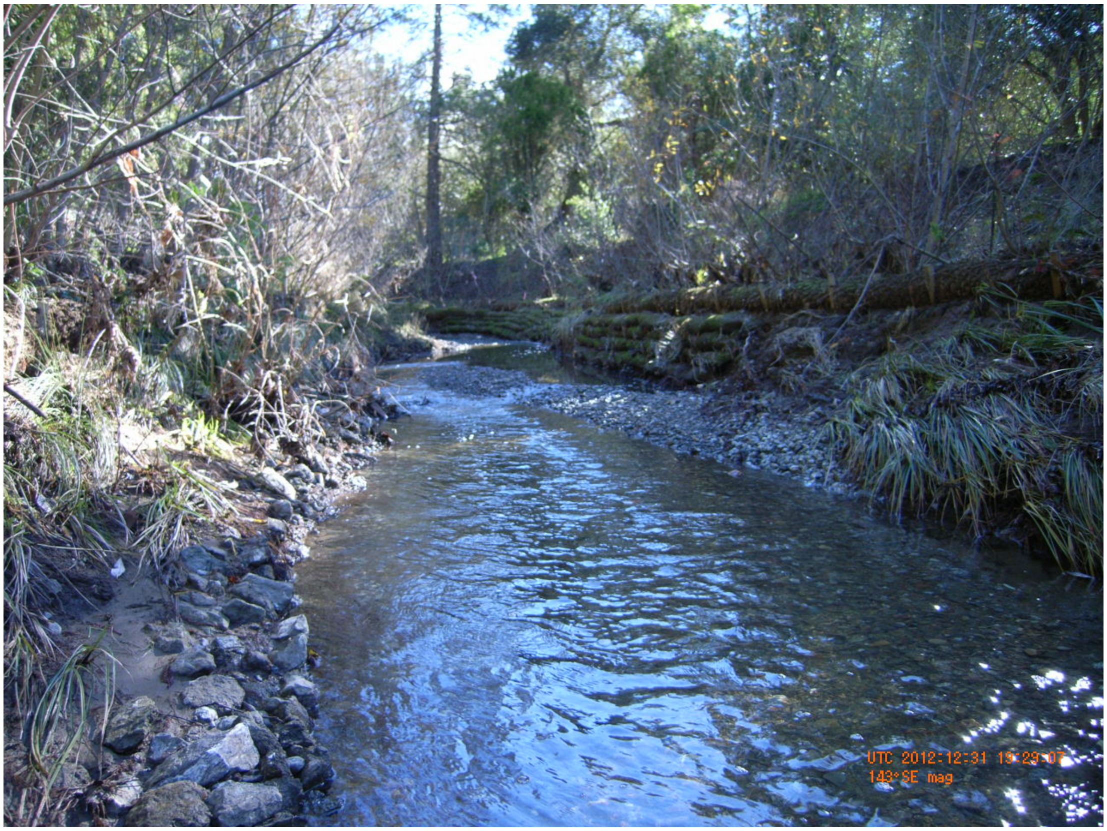
Post-Construction – Upstream View (March 2009)



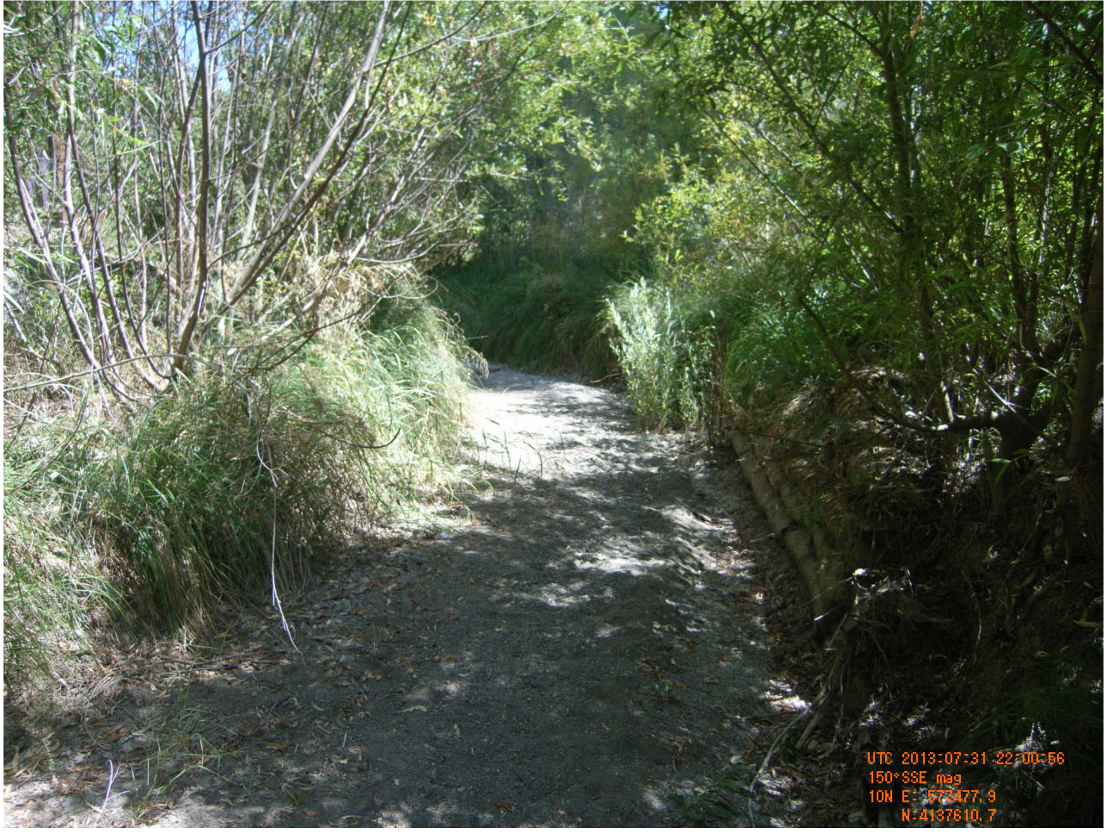
Year 1 Monitoring Photo – Upstream View (Dec. 2010)



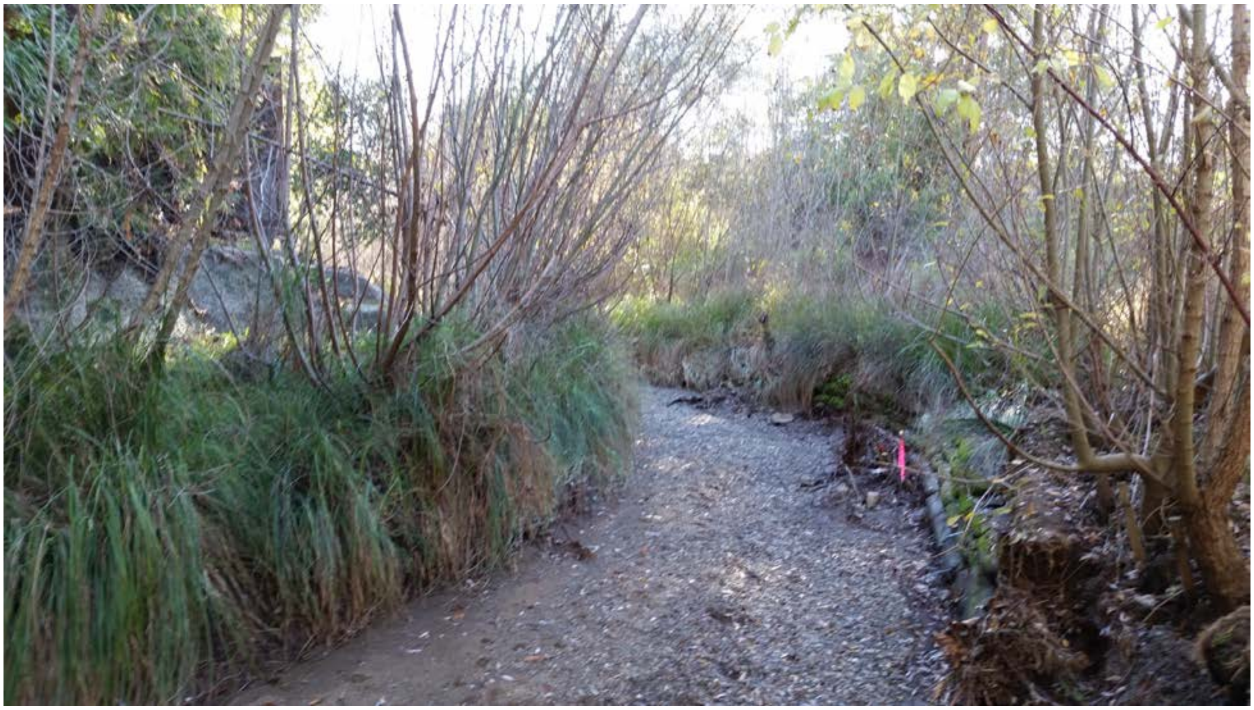
Year 2 Monitoring Photo – Upstream View (Dec. 2011)



Year 3 Monitoring Photo – Upstream (Dec. 2012)



Year 4 Monitoring Photo – Upstream (July 2013)



Year 5 Monitoring Photo – Upstream (December 2014)

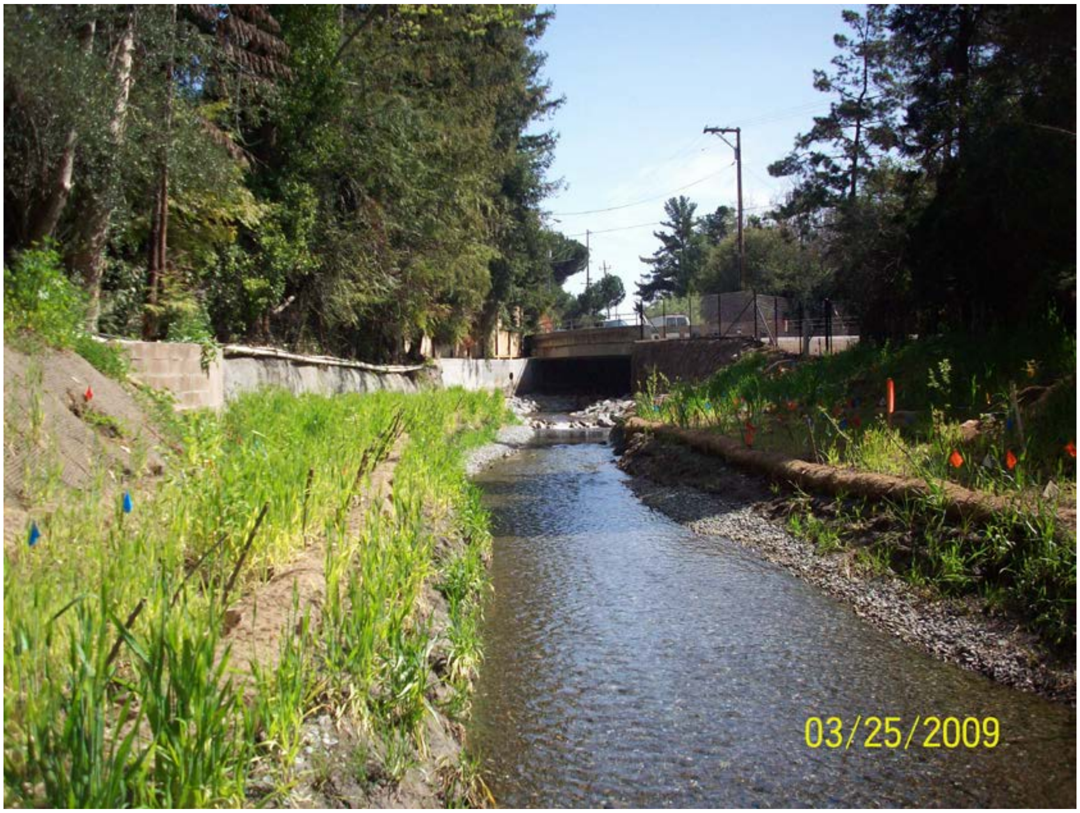
Site Evaluation – Station 1+270

The repairs along this section were significant. An existing cinder block lined, u-frame channel was abandoned and filled, and a new channel was constructed with flood plain benches on both sides. An existing wooden retaining wall and chain link fence were removed while an existing shotcrete wall remained. The site was planted with willow stakes and native plants. A thick layer of small gravel was added to the invert to protect the channel from scour.

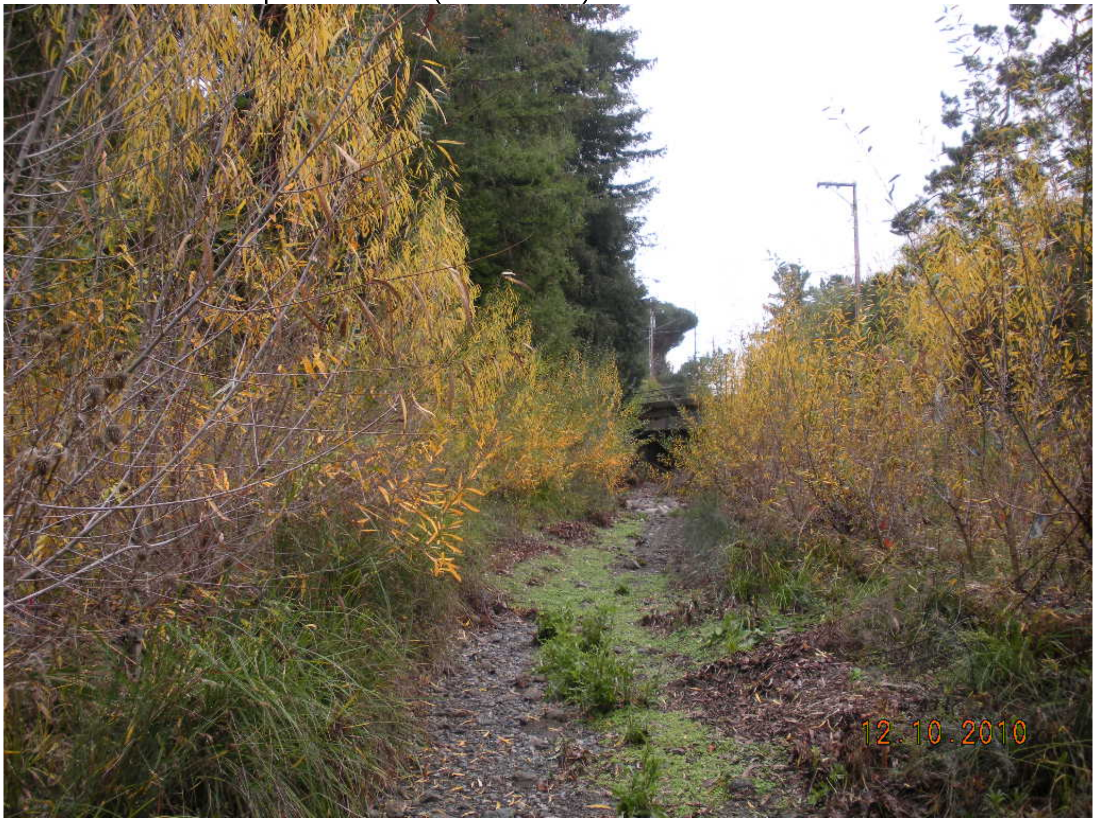
The channel form at this channel cross section has not changed significantly. The data shows some scour along the west toe of the channel which occurred in year 1 post-construction is still evident and remains stable.

Field observations show the willows have more than thrived and are overtaking the channel banks. This assists in keeping the water velocity to a minimum. Material has been deposited along the channel bottom, showing the water velocity slows down along this reach. The plantings are doing well and the side slopes and benches are very stable.

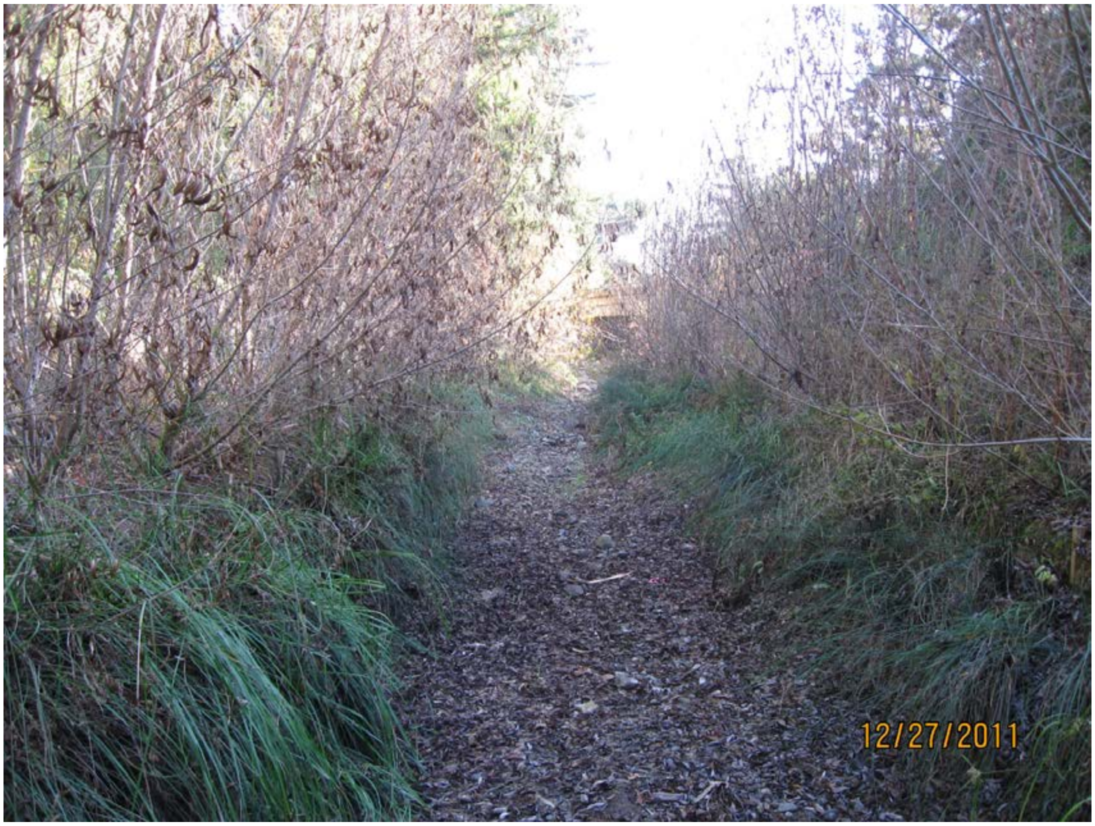
Monitoring Photos



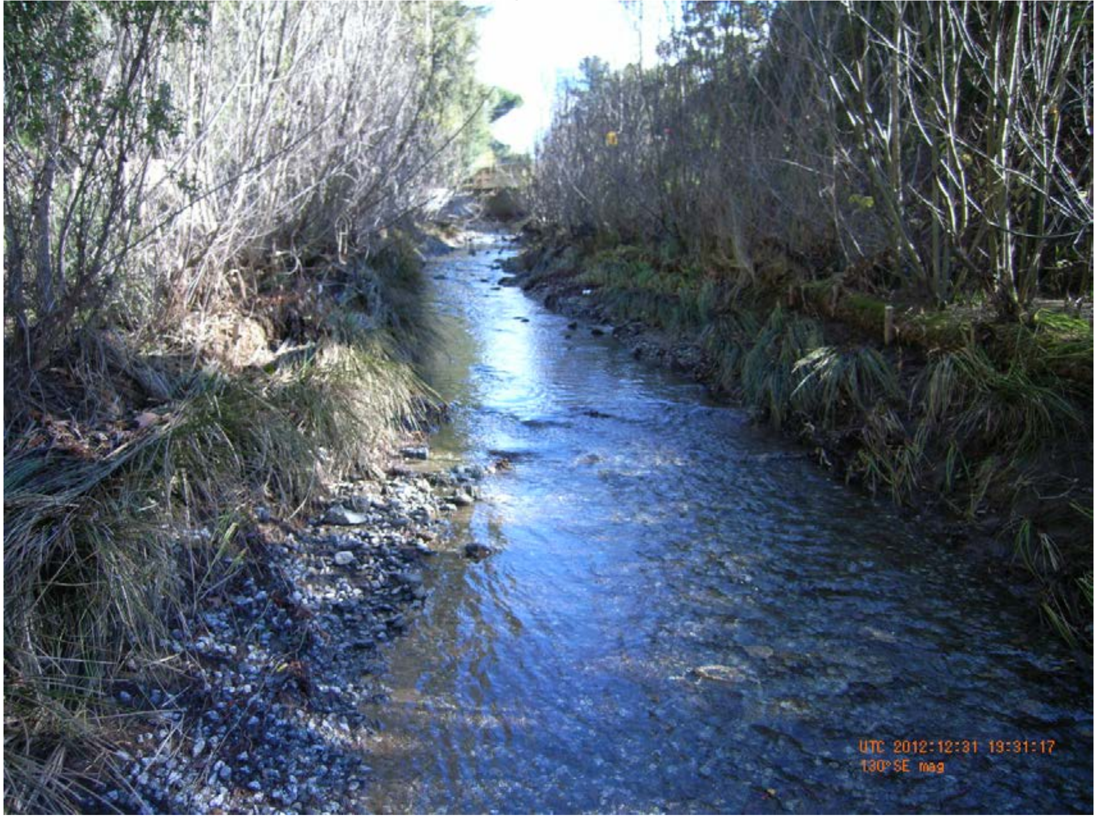
Post Construction – Upstream View (March 2009)



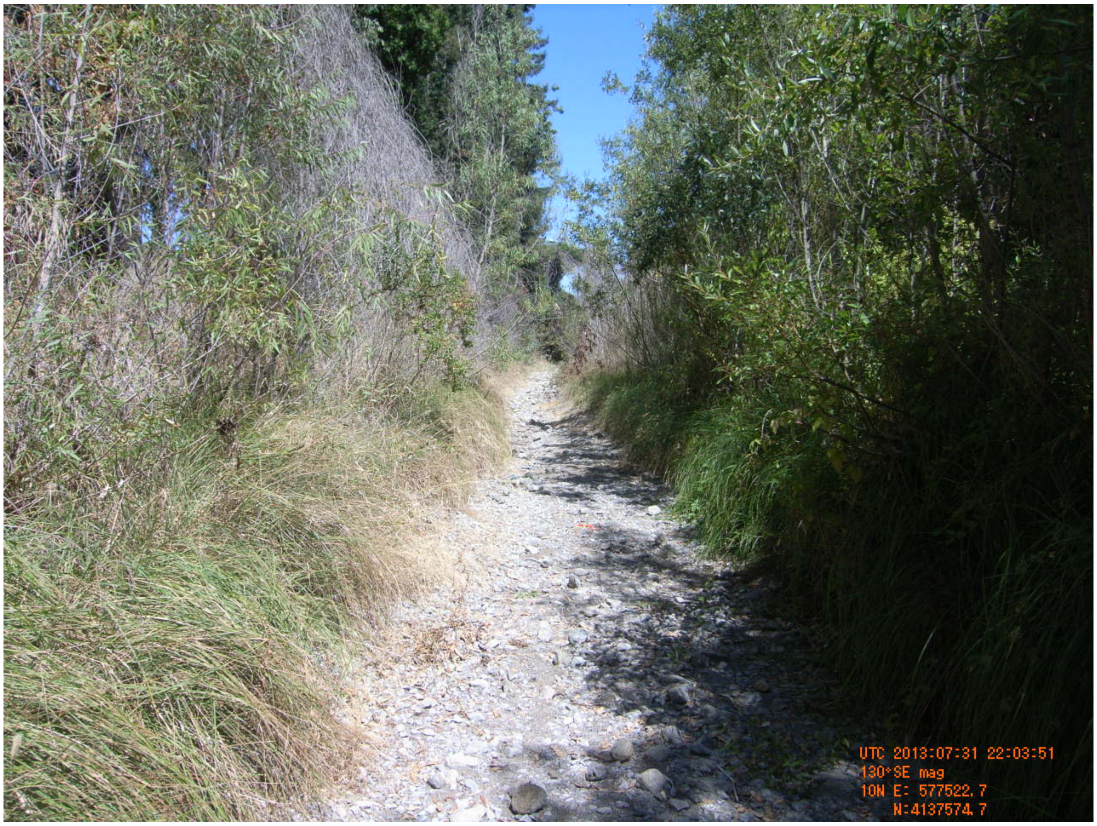
Year 1 Monitoring Photo – Upstream View (Dec. 2010)



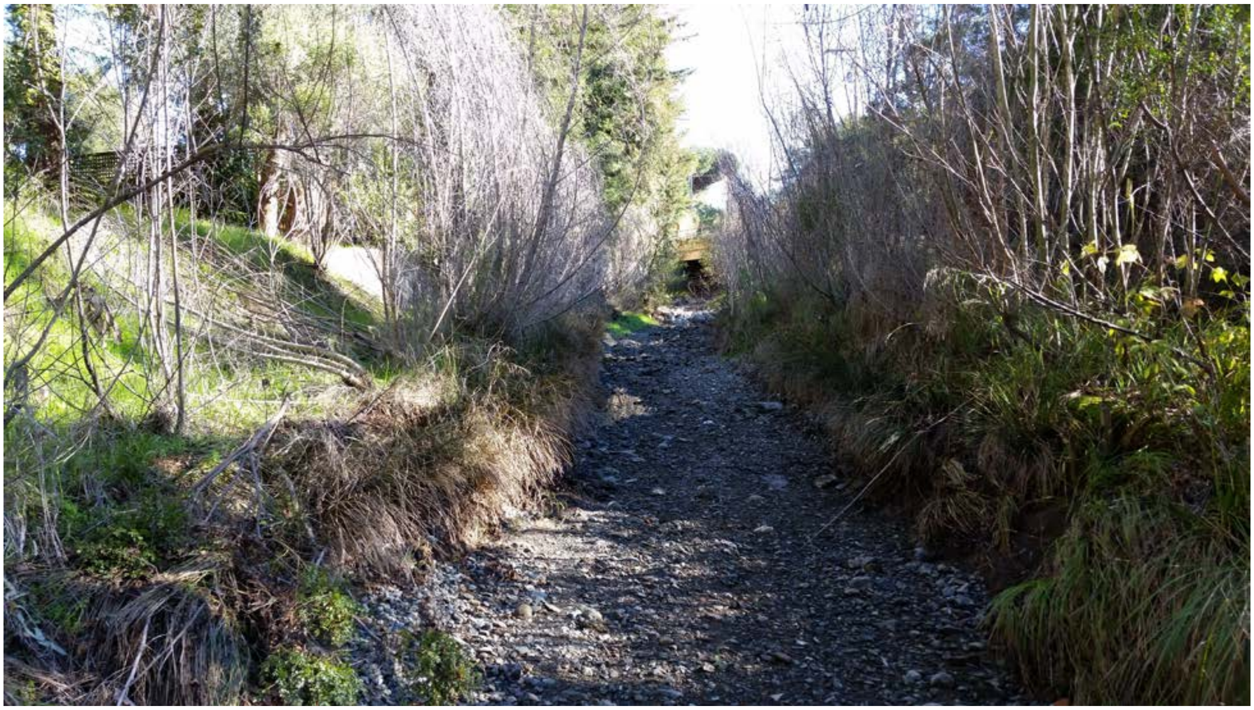
Year 2 Monitoring Photo – Upstream View (Dec. 2011)



Year 3 Monitoring Photo – Upstream (Dec. 2012)



Year 4 Monitoring Photo – Upstream (July 2013)



Year 5 Monitoring Photo – Upstream (December 2014)

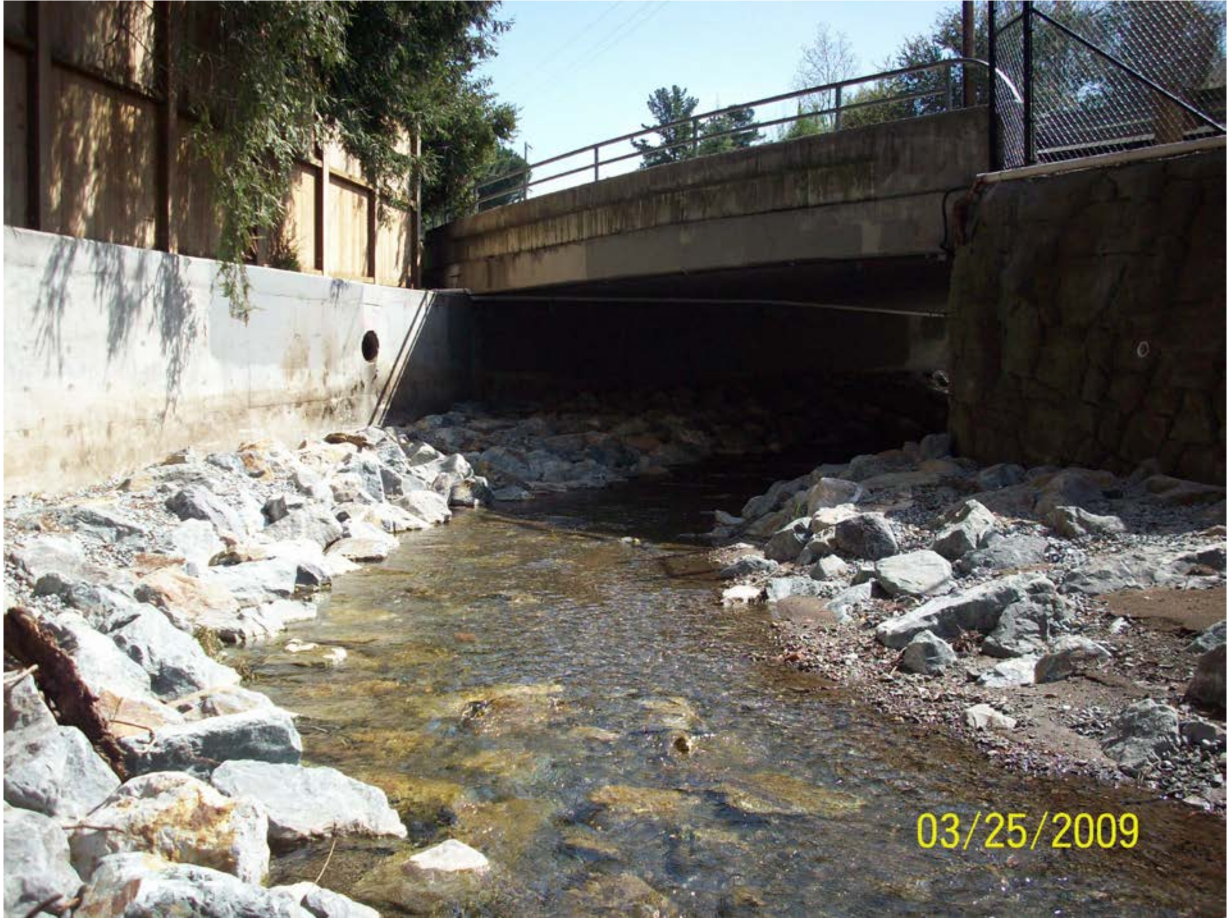
Site Evaluation – Station 1+310

Repairs along this section consisted of removing an existing wingwall on the west bank (Los Altos Hills side) and rebuilding it to better align with the new channel. An existing wingwall on the east bank (Los Altos side) remained and was extended to the District property line. One and a half feet of sediment was removed from under the W. Edith Avenue Bridge and rock step pools were constructed.

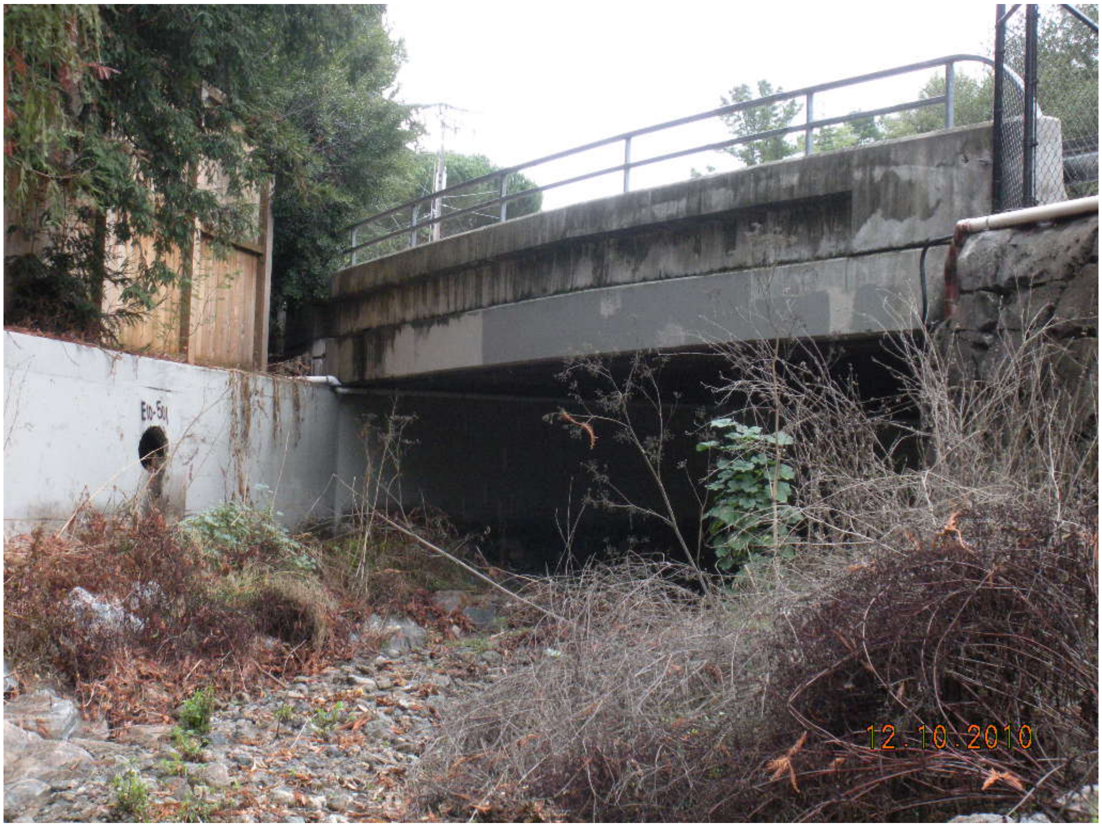
The survey data shows the cross sectional profile has remained unchanged.

Field observations show this section of channel to be stable. Debris has been deposited on the grouted rock lined channel adjacent to the low flow channel. The channel transitions from grouted rock to a gravel lined, earthen channel at this location. There are no signs of erosion.

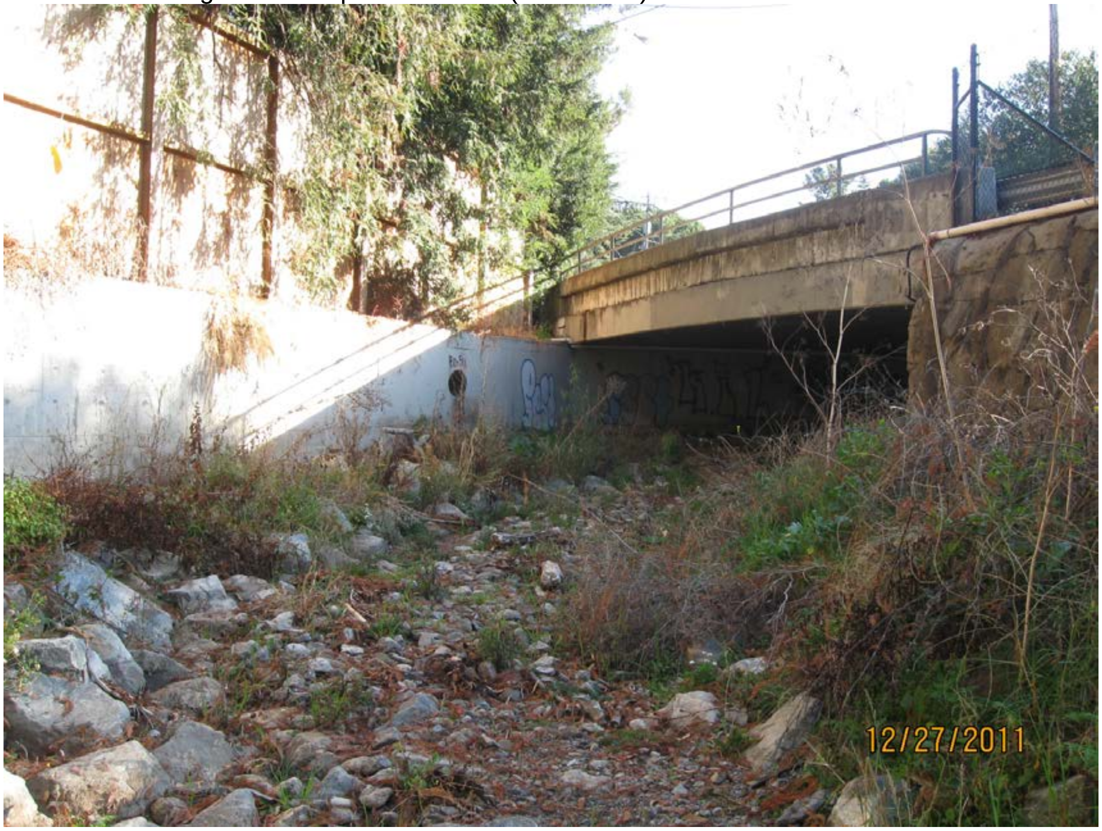
Monitoring Photos



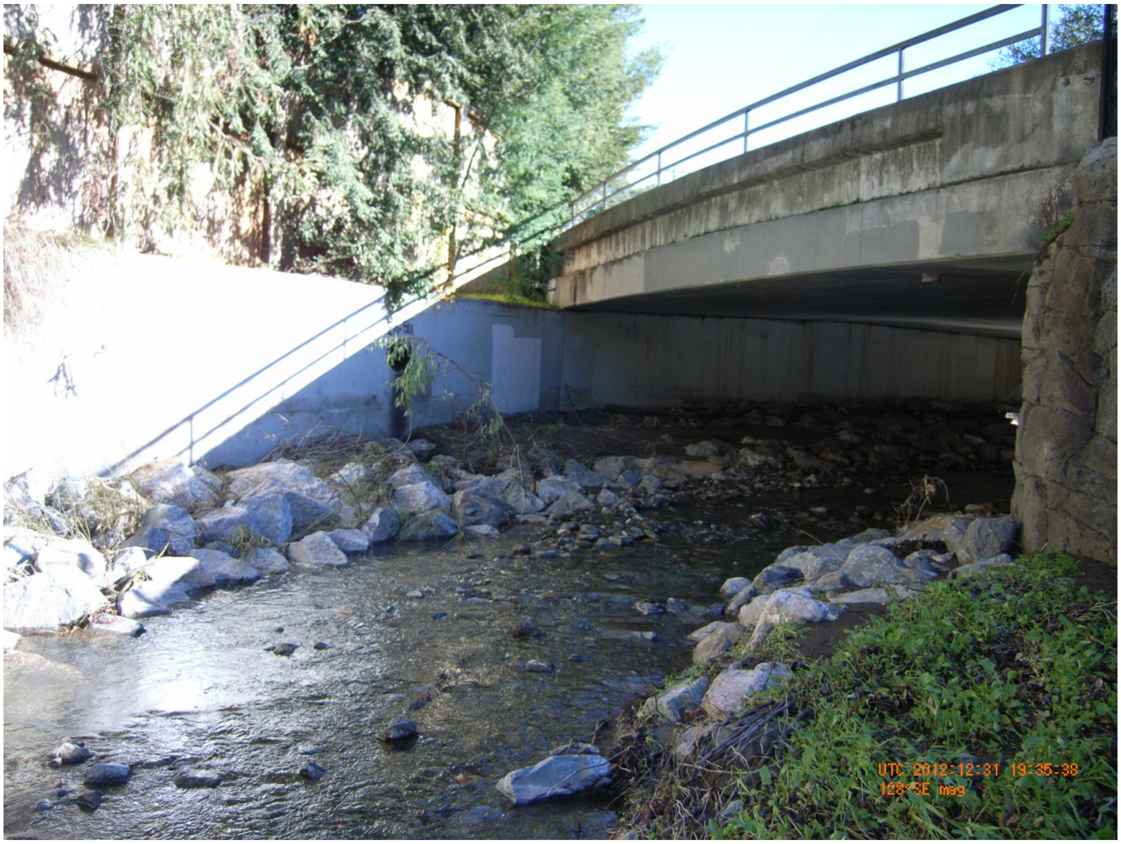
Post Construction – Upstream View



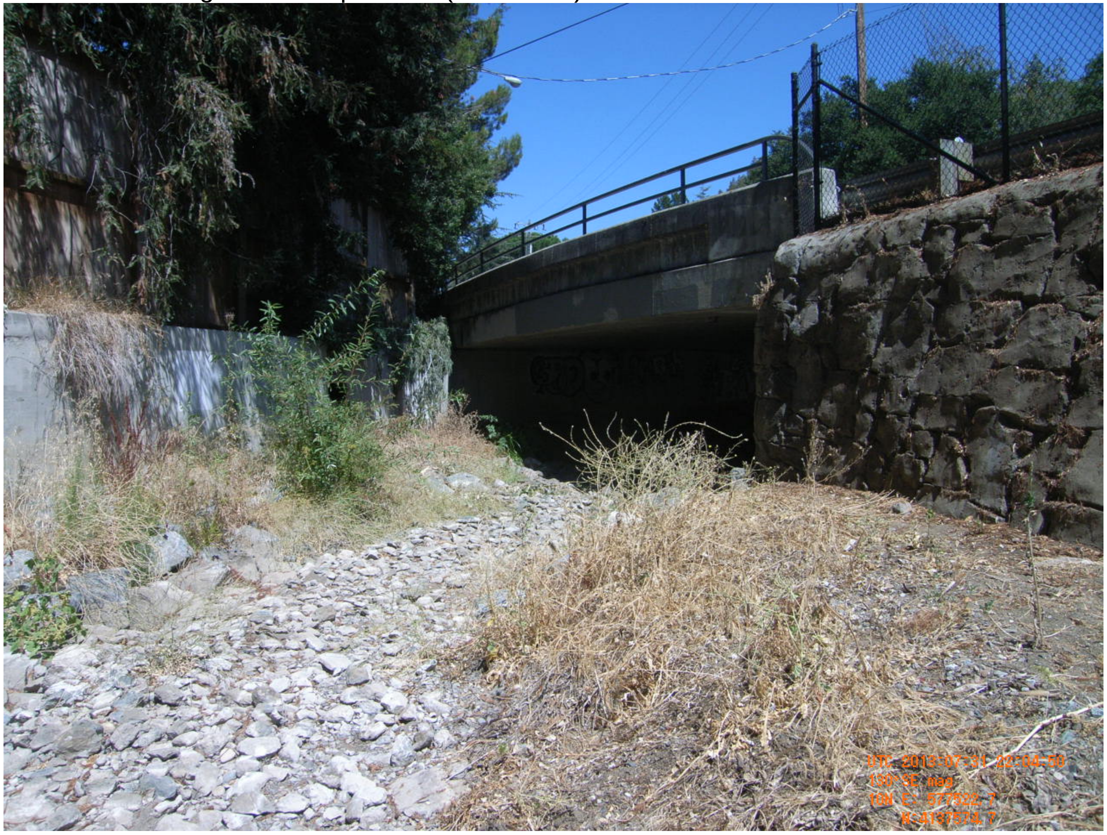
Year 1 Monitoring Photo – Upstream View (Dec. 2010)



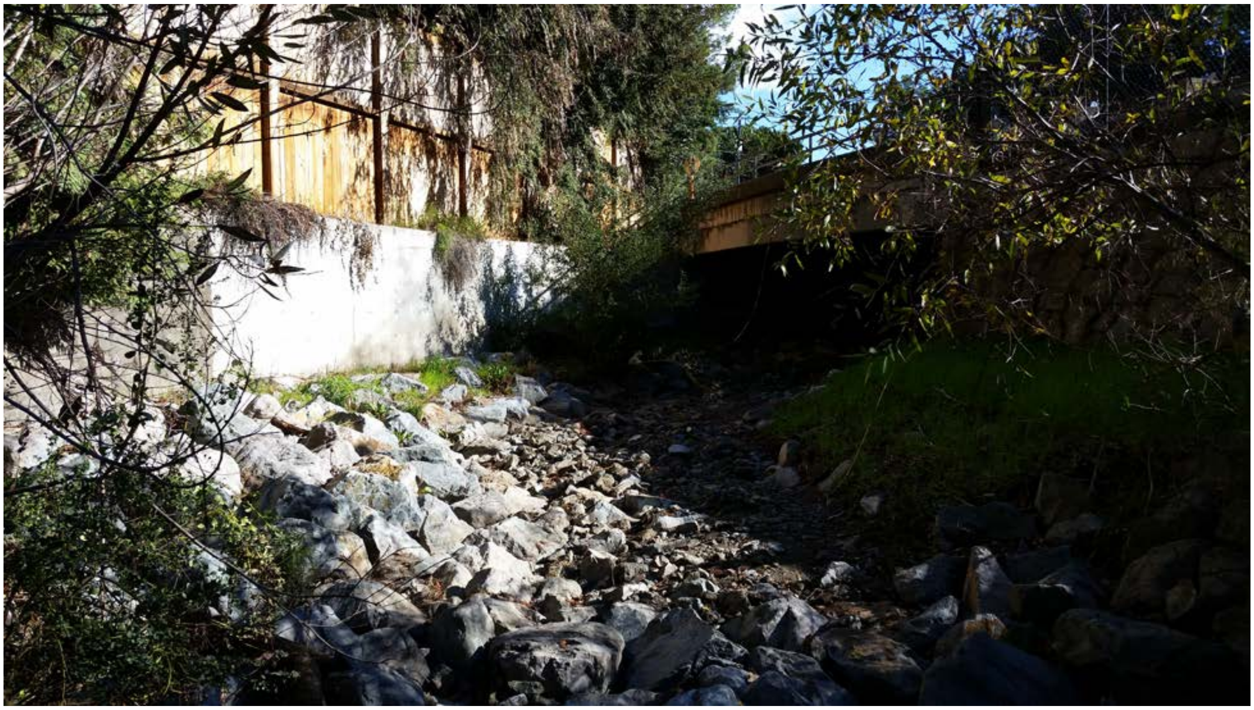
Year 2 Monitoring Photo – Upstream View (Dec. 2011)



Year 3 Monitoring Photo – Upstream (Dec. 2012)



Year 4 Monitoring Photo – Upstream (July 2013)



Year 5 Monitoring Photo – Upstream (December 2014)